APRIL, 1954

TOOLING and PRODUCTION

The Magazine of Manufacturing Management

Vol. XX, No. 1

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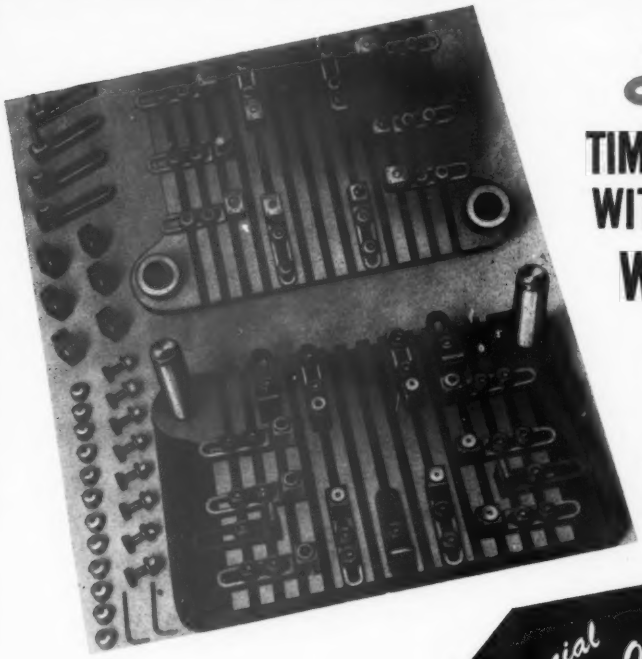

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Adjustable Perforating

DIE SET

Special Introductory Offer

To prove the advantages of Whistler Adjustable Dies under your production conditions, we are offering these U-375 units at a special low price.

1 DS-1012-1 (10"x12") T-Slotted Die Set
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Punches and dies are your own selection of sizes from 1/32" up to 3/8" diameters. Everything needed to start production is included.

Shipped complete upon receipt of your order for only $324.80 Net F.O.B. Buffalo, N. Y.

A money-saving opportunity to prove in your own plant the many advantages of Whistler Adjustable Dies. Now being employed by thousands of metal working shops. The compact design of this special U-375 unit (10"x12" working surface) provides up to 25 holes, 1/32" to 3/8" diameter. Pierce materials up to and including 1/16" mild sheet steel . . . in one operation. Minimum centers of 7/8" are permitted. Set-ups are made quickly and into production within hours. Precision perforating on long or short runs at much reduced expense. Re-use of punches and dies writes off first cost. The U-375 unit is complete ready for immediate set-up.

Special U-375 Booklet and General Catalogs.

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In brief informative style, with clear-cut illustrations, this literature gives complete details about Whistler Adjustable Dies. Write today.

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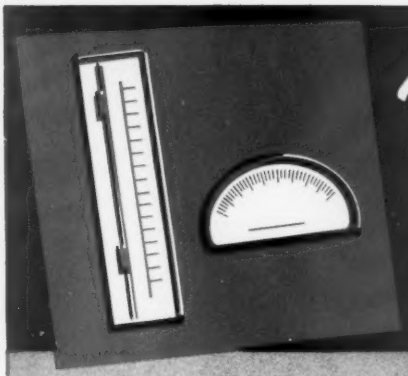
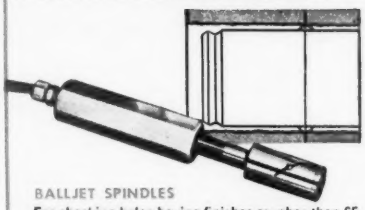


Modernize FOR LOW COST PRODUCTION with Newest Developments In Air Gaging

Already these newly developed practical precision tools are helping produce more and better products at lower cost in innumerable plants throughout the world.

Space restrictions here preclude anything more than the briefest description. Phone, wire or write for specifications, prices and delivery—or call the Sheffield sales engineer in your vicinity.



BALLJET SPINDLES

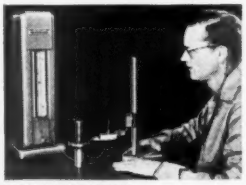
For checking holes having finishes rougher than 65 micro-inches, for porous parts, narrow lands or checking to the very end of a hole. Setting is made with gage blocks and a Standard Calibrator. NO MASTER SETTING RINGS REQUIRED—not even one.

ADJUSTABLE SPINDLE KIT

One, two, three or four spindles may be quickly assembled from components in the kit, for any size between 1 and 3 inches. Gage blocks are used to set for size and to calibrate air gage for amplification.

ADJUSTABLE AIR BORE GAGE

A light, high precision (2,000 to 1 amplification) self-centering bore gage that is easily adjustable from 3" to 12" in diameter. Calibrated by a Standard Calibrator and gage blocks.

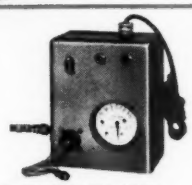


AIRETEST INDICATOR

Replaces an indicator where more accuracy and higher amplification are required. Always gives precise readings regardless of the direction of approach. No lag—no gears—nothing to wear out of adjustment. Amplifications up to 5,000 to 1.

AIRELECTRIC HEAD

Converts air pressure variations at the gaging contact into electrical impulses which actuate classification and segregation mechanisms or machine control devices. Accurate to a fraction of a "tenth".



ELECTRO-PNEUMATIC UNIT

A self-contained unit of Airelectric Head, indicating dial and signal lights. Easily mounted on the machine to control machine operation by precision measurement of the machined surface. Makes machining automatic. Also used for automatic gaging and segregating.

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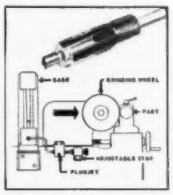
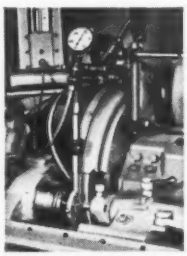
The key element of the machine "Feed Gage" which eliminates error due to feed screw wear. Also, due to the high amplification, makes it easy to manually control the feed to fractional "tenths".



PLUNJET CALIPER TYPE GAGE

Air Gaging Cartridges are used with Caliper Gages for continuous sizing of work on external grinders. Dial is used for approach—PLUNJET brings to final size.



PLUNJET GAGING CARTRIDGES

Precise, low-cost gaging elements which you may incorporate in your own gaging fixtures singly or in multiple to measure practically any dimension or geometrical relationship, with tolerances ranging from .0005 to .100.

GAGE DIVISION, *The Sheffield Corporation*
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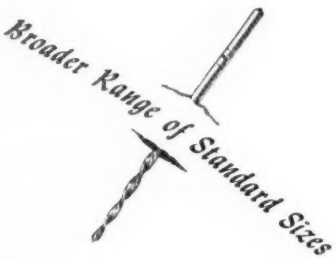
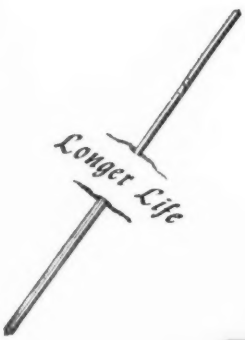
CIRCLE INFORM-A-GRAM KEY NO. 3

L&I Reamers give you more





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LAVALLEE & IDE, INC.
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CIRCLE INFORM-A-GRAM KEY NO. 4

TOOLING and PRODUCTION
The Magazine of Manufacturing Management

formerly
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TOOL & DIE JOURNAL 1941-51

VOL. XX—No. 1 APRIL, 1954

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TOOLING and PRODUCTION'S great appeal is to those men who operate the plants and divisions of industry, their production departments and their toolrooms. It is they who collectively are charged with the responsibility of manufacturing their companies' products precisely, efficiently and profitably.

They have the influence that enables them to adopt the ideas and the processes which TOOLING and PRODUCTION describes in every issue AND the authority to recommend, to specify and/or to buy everything that may be needed to reduce costs, increase production or improve quality. These men for whom, each month, our editors seek out or write TOOLING and PRODUCTION'S meticulously accurate stories of "Know-How" and "Tell-How" are T & P's exclusive Cycle of Buying Influence (CBI) in their plants.

Every copy is directed to these men by name, by title and by company address. Please see our CCA verification.

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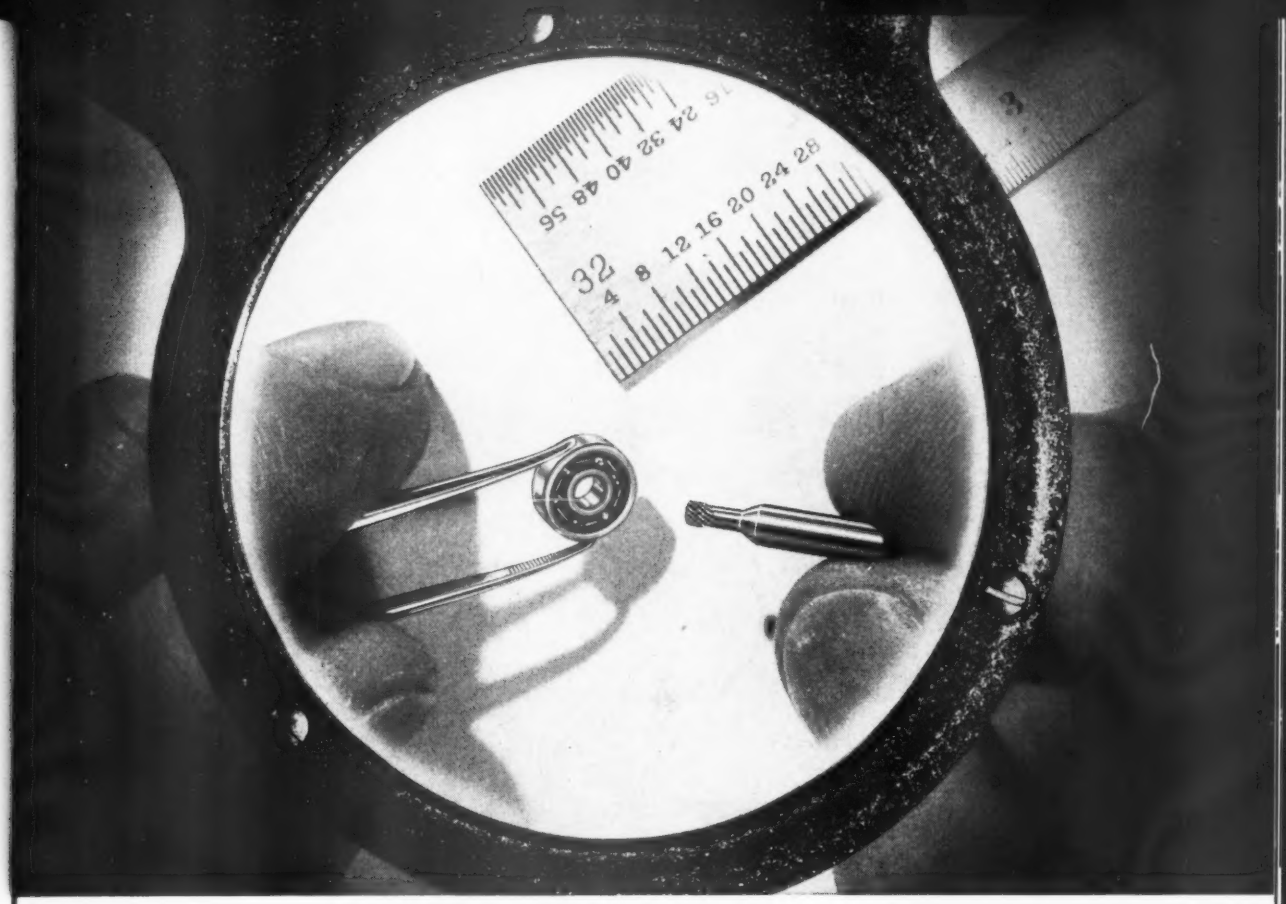

For Finishing Small Holes

(Down to .032" dia.)

ECONOMICALLY . . .
OVER 2,000 PIECES PER BUR

RAPIDLY . . .
AS LITTLE AS 30 SECONDS PER PIECE

ACCURATELY . . .
TO .0002" FOR SIZE AND 50 MILLIONTHS FOR ROUNDNESS

You can't beat a KELLERFLEX CARBIDE HOLE FINISHING BUR

Small hole finishing with Pratt & Whitney KELLERFLEX Burs is superior to all other methods. In actual production, a single bur has finished as many as 3,000 holes in hardened steel bearing races . . . compared to only 7 for mounted points. Only Kellerflex Carbide Hole Finishing Burs, engineered and master machine ground for precision and concentricity, can deliver this cost-cutting performance.

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Also see our Dioform on demonstration, and the P&W Pneumatic Grinding Head; talk over your problems with our Engineers.

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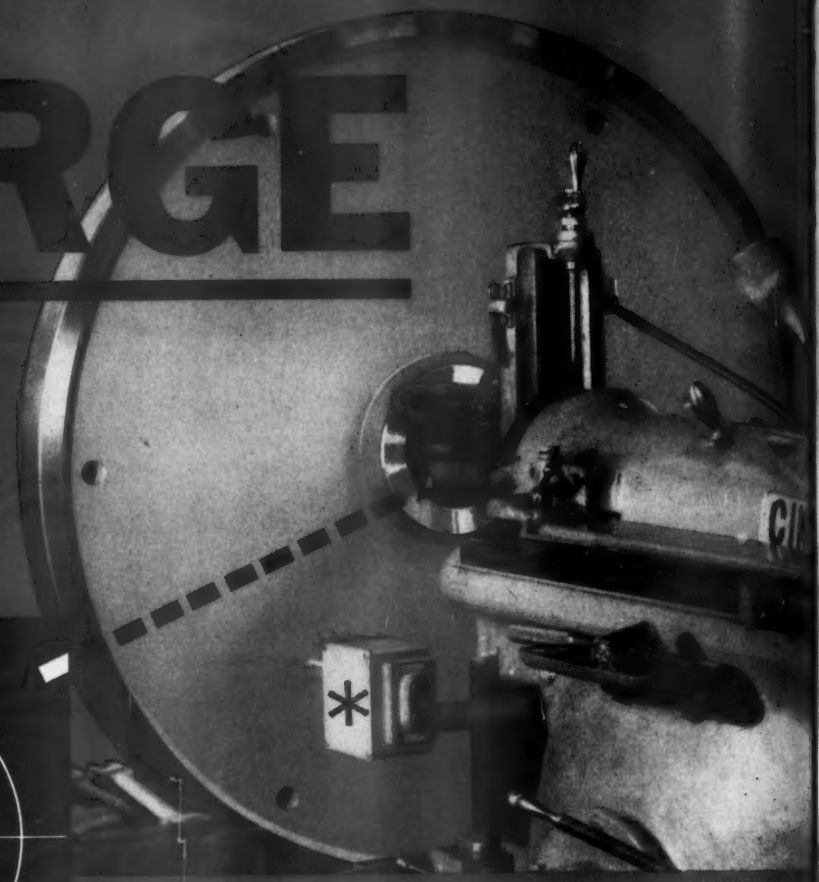
MACHINE TOOLS • CUTTING TOOLS • GAGES

INTERNAL SHAPING the LARGE job....



*The new Electro-Magnetic Clutch and Brake greatly speeds set-up and operation.

Internal shaping is the only practical method for many "hard to get at" jobs.

This large job is especially adaptable to this rigid Cincinnati Shaper with "drop" table. Kennedy keyways are cut to .0005" tolerance in this big gear. The low cost fixture and tool make this job profitable and simple.

Other economical internal shaping jobs include...

- Internal oil grooves.
- Internal contouring.
- Internal teeth on special gears.
- Internal guides in gate valves.
- Internal slotting.

Write for New Cincinnati Shaper Catalog N-6.

THE CINCINNATI SHAPER CO.

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CINCINNATI

you'll be glad you switched to **BALAS**

Smooth Feeding
Long Lasting
Stock Saving

Balas PUSHERS

You'll see an immediate improvement both in quality and in continuous money-saving operation resulting from the proper use of Balas Feed Fingers and Master Pushers. Selected tool steel, accurately machined, carefully heat-treated and thoroughly inspected guarantees proper tension and smooth feeding.

Balas Pushers have made remarkable records on long runs...turning out millions of pieces without breaking down on the job. They help you make more profit on your production line and reduce stock waste at the same time. Difficult feeding jobs and scratchless operations are readily handled with the correct Balas Feed Finger or Master Pusher. Order from our large stock of standard types and sizes. You'll make more ...you'll save more with Balas!

THE BALAS LINE INCLUDES

- Master Collets and Pads
- Pushers and Feed Fingers
- Master Pushers and Pads
- Ejector Collets
- Collet Sleeves and Chuck Nuts for B.&S. Machines
- Carbide faced Stock Stops for B.&S. Machines

BALAS COLLET MANUFACTURING CO.
CLEVELAND 14, OHIO

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Brockport, N.Y.; Atlanta, Ga.; Moline, Ill.; Houston, Tex.; Minneapolis, Minn.; Indianapolis, Ind.; Omaha, Neb.; Shreveport, La.; Detroit, Mich.; Philadelphia, Pa.; Oakland, Calif.; Newark, N.J.; Cleveland, Ohio; Kansas City, Mo.; Glendale, Calif.; Madison, Conn.; Chicago, Ill.; Flint, Mich.; St. Louis, Mo.; Westbury, N.Y.; Portland, Ore.; Denver, Col.; Brantford and Montreal, Canada.

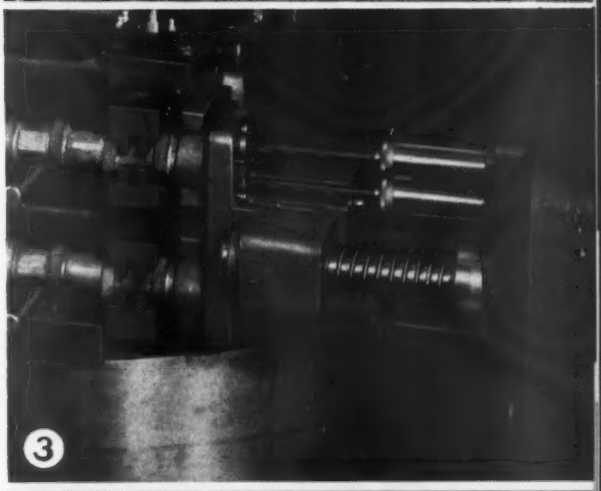
CIRCLE INFORM-A-GRAM KEY NO. 7

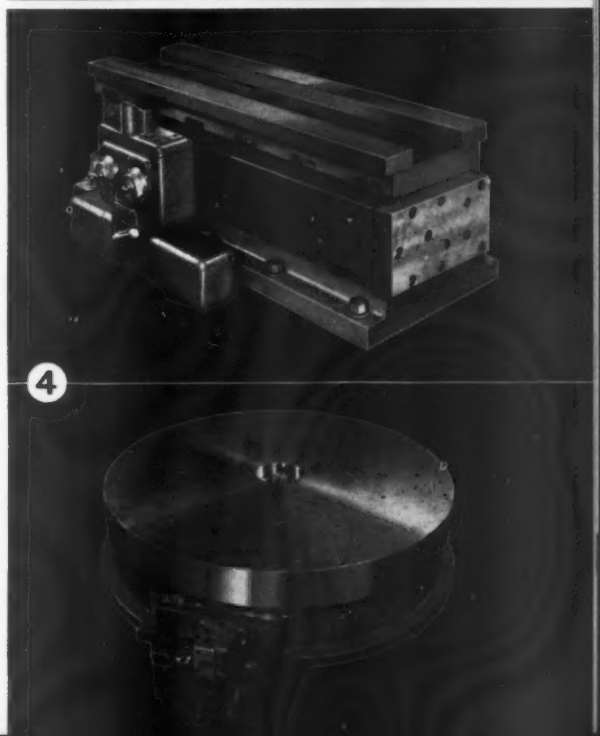
PRODUCTION MACHINING REPORT:

New production machine mills and drills 288 camshafts hourly

THREE of these high production, four-station rotary indexing machines were recently installed by one of the world's largest automotive manufacturers. A particularly interesting aspect of the machines — which were designed and built by Kearney & Trecker — is the fact that standard units were utilized wherever possible. This not only moved up the delivery date, but also resulted in a dramatic saving in cost. See photos 1, 2 and 3 for the sequence of operations which results in production of 288 cast iron camshafts per hour per machine.

Basically, the machine is comprised of a 60" rotary indexing table and base . . . two milling units, each with one spindle . . . one drilling unit with two spindles . . . and a second drilling unit with four spindles.





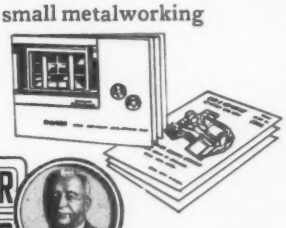
1. After 2 workpieces have been manually loaded, table indexes automatically to station 2, where both ends are milled to length. Each milling unit has a 10" dia. face mill with 36 T.C. inserted blades. Left hand head is powered by a 7½ hp motor. Right hand head by a 10 hp motor.

2. Table automatically indexes to drilling station and camshafts are center-drilled on each end. Drilling units are powered by a 1 hp motor. (Motor partially cut away to show drilling). Each of 4 hydraulic clamping and equalizing fixtures holds 2 workpieces. Location of workpiece is taken from end body diameters with end location from the center bearing.

3. At the final station there is a 2 hp drilling head which carries 4 spindles. Two drive holes are drilled in one end of each camshaft. Spindles operate at fixed speeds.

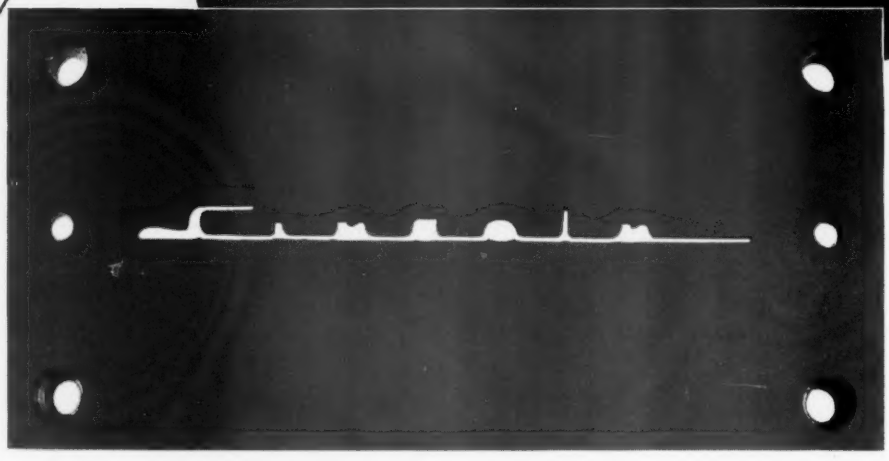
4. Here are two of the components which make major contributions to the machine's performance at reasonable cost. TOP: This is the feed slide unit. It is available in four standard sizes. All sizes feature a hydraulic control panel which can be mounted at either side... hardened and ground ways... a massive one-piece base casting which absorbs vibration. BOTTOM: This 60" rotary indexing table is one of four standard sizes available. Each table can be arranged for any practical number of indexes or for continuous rotary feed.

For more comprehensive facts on this machine and its standard units, write for Data Sheets No. 1018, No. 1019 and No. 1020. For details on the facilities and engineering services offered by our recently expanded Special Machinery Division, see your representative or write for booklet, "Doorway to a proven method for solving big or small metalworking problems." Kearney & Trecker Corp., 6784 West National Ave., Milwaukee 14, Wisconsin.

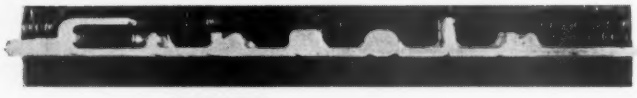


KEARNEY & TRECKER
CORPORATION
Special Machinery Division
MILWAUKEE 14, WIS., U. S. A.

can you make this trim die in eleven hours in your plant?



FINISH TRIM DIE



ELECTRODE

man hours:

ELECTRODE MACHINING	8 hours
SETUP	2 hours
CUTTING TIME	1 hour

we will show you how

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elox corporation of michigan

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CIRCLE INFORM A-GRAM KEY NO. 10

MILWAUKEE 14, WIS., U. S. A.

at the ASTE industrial exposition

Philadelphia - April 26-30

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where qualified Company representatives
will be on hand
to discuss with you these
two newest Latrobe developments
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high speed steels
FM—"free-machining"
high production die steels.

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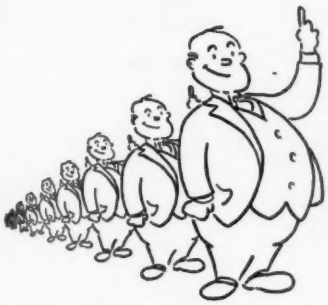
Applied To Frauenthal's Special Machine Tool



MR. DUPLICATOR SAYS—"We note that there are many special machines being made to turn complicated forms. Do you get into any of this type business?"

WALKER SAYS—"Yes Mr. Duplicator, we have put many Duplicators on machines for special jobs. The versatility of our Duplicator in its design is just unlimited. This is brought out very clearly in the special boring mill and grinder combination that Frauenthal has just recently placed on the market. We furnish Duplicators for this very fine precision tool to machine the odd contours that their customers have to turn.

No one questions but what Frauenthal builds a machine tool that is the acme of perfection, and if our Duplicator was not also outstanding we would not be brought into the picture. This is the result of approximately 25 years experience in building hydraulic Duplicators.

WALKER DUPLICATORS are simplicity personified. We have a development in our Tracer Control Valve that enables us to reproduce the slightest change in the surface of the Template. In one particular job we have to reproduce a .0015 taper per inch. Our Duplicators are built to go on the smallest machine tools as well as the largest. These Duplicators apply to Milling Machines, Boring Mills (Horizontal or Vertical), Lathes, Planers, Shapers, and Grinders.

Due to the light touch that our Tracer Tip has, it is possible to duplicate from a Template that does not have to be hardened. Consequently Templates can be extremely accurate and yet be very inexpensive. Any changes necessary can be made without taking it off the Template Holder.

WALKER DUPLICATORS use no mirrors, periscopes, clutches, or electronic devices—just simple hydraulics applied to the machines already in your shop.

MODERNIZE THE MACHINES YOU ALREADY HAVE—We can furnish a thorough and understandable solution to your Duplicating problems. Send us a print of the part to be made, along with the make and size of machine to be MODERNIZED, and we will give you recommendations and firm quotation.

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CIRCLE INFORM-A-GRAM KEY NO. 12

See the Saws

AT PHILADELPHIA

INDUSTRIAL EXPOSITION, A.S.T.E.

at MOTCH & MERRYWEATHER

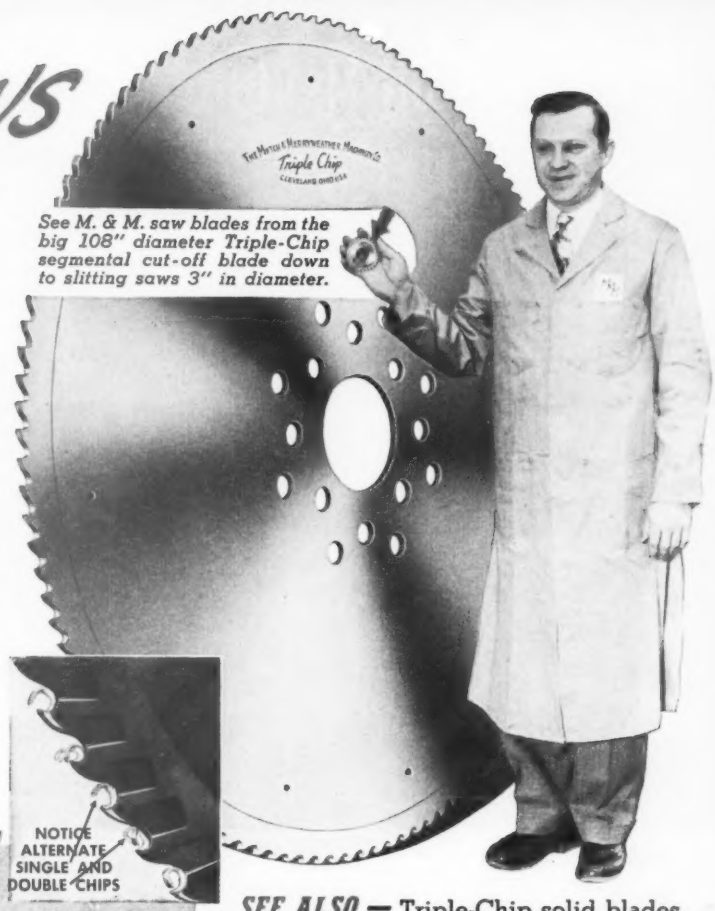
BOOTH 731

One stop here and you'll have the complete story on circular saw blades and face milling cutters. Triple-Chip Saw Blades cut off any machinable material, ferrous or non-ferrous, large or small, any shape, any thickness. Get the complete story, too, on slitting saws in all sizes and thicknesses, as well as on special saws. Our sales engineers will welcome an opportunity of talking with you about any problems you may have in this field — both at the Show and afterwards.

THE MOTCH & MERRYWEATHER MACHINERY CO.

Cutting Tool Manufacturing Division

CLEVELAND 17, OHIO



See M. & M. saw blades from the big 108" diameter Triple-Chip segmental cut-off blade down to slitting saws 3" in diameter.

The M. & M. Triple-Chip grind reduces tooth strains, lengthens blade life, and speeds production with accuracy.

Fifty Years 1904 - 1954

SEE ALSO — Triple-Chip solid blades, 8" through 20" diameter for cutting off smaller stock.

SEE ALSO — THE MOTCH & MERRYWEATHER KROSLOK MILLING CUTTER..

Only 3 members — body, blade, wedge. Waffle design of blade mates rigidly with waffle in body. Cuts any machinable material. A profit-making investment in precision production milling.

SEE ALSO — MOTCH & MERRYWEATHER

Triple-Chip SLITTING and SLOTTING SAWS

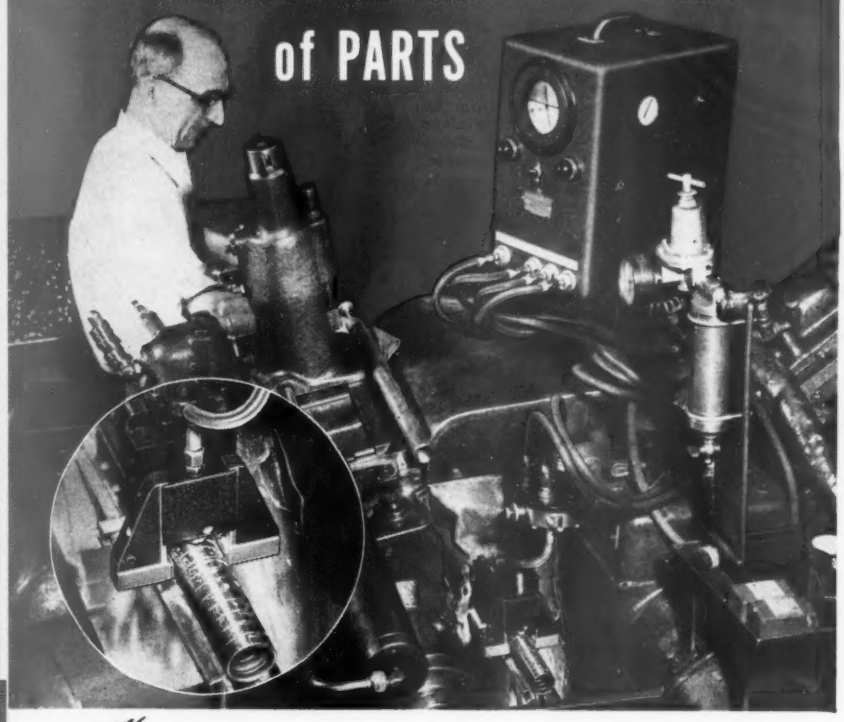
3" through 8" dia.

Dual Drive reduces the hazard of blade breakage.

SEE ALSO — **Motch & Merryweather Triple-Chip Heavy Duty Anti-Weld Soluble Oil.**

SEE ALSO — M. & M. Master-Cut slitting and slotting saws, with optional Dual Drive. 3" through 8" diameter.

Continuous ON-MACHINE GAGING of PARTS



with

PRATT & WHITNEY AIR-O-LIMIT *Gages*

Engineered by Pratt & Whitney for a leading bearing manufacturer, this special application utilizes an Air-O-Limit Gage with Light Signal Control Unit mounted directly on a centerless grinder used to finish outer bearing races. These races ***must be accurate*** . . . tolerances are held to .0003". As the races are fed from the machine, they are gaged ***continuously and automatically*** . . . providing these important advantages:

- **REDUCED SCRAP LOSS** . . . Rejects used to average 1.5%; have dropped to as low as 0.59% for a full week's production.
- **FASTER PRODUCTION RATE** . . . up to 90 races per minute, without sacrificing accuracy . . . is possible as a result of continuous gaging.
- **LESS NON-PRODUCTIVE TIME** . . . operator can correct machine before parts exceed limits *without* stopping production.

SEE THE AIR-O-LIMIT GAGE at the A.S.T.E. SHOW! Philadelphia . . . April 26-30

PRATT & WHITNEY
DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U. S. A.
SINCE 1860

Bring your special gaging problems with you. Talk them over with the P&W Gage Engineers at Booth No. 1531. They can provide the answers.

First Choice for Accuracy

BRANCH OFFICES AND STOCK . BIRMINGHAM* . BOSTON . CHICAGO
CINCINNATI . CLEVELAND . DALLAS (The Stanco Co.) . DETROIT . LOS ANGELES
HOUSTON (The Stanco Co.) . NEW YORK . PHILADELPHIA . PITTSBURGH
ROCHESTER . SAN FRANCISCO . ST. LOUIS . EXPORT DEPT., WEST HARTFORD

MACHINE TOOLS • CUTTING TOOLS • GAGES

AUTOMATION
is a PRACTICAL tool

IT'S COMING YOUR WAY . . . COSTS NEEDN'T BE PROHIBITIVE . . . HERE ARE THE SIMPLE FACTS

Despite recent developments in some fields, the completely automatic factory . . . with raw materials fed into one end of a mile-long transfer machine and finished products emerging from the other . . . is something in the rather distant future for most manufacturers. However, Automatic Process Control (which will be a vital *part* of eventual complete automation) is just around the corner. For thousands of manufacturers it will soon provide the immediate, practical answer to industry's need to produce more accurate parts faster and at lower cost.

SELF-CORRECTING MACHINES ARE NEXT

Automatic "self-operating" machines are now in common use; tomorrow these machines will be "*self-correcting*" as well. Pratt & Whitney Gages, for example, have already been applied to many types of machining and other operations to provide automatic, in-process gaging. All that remains is to provide a "feed-back" from the gage to the machine to effect corrections automatically. The P&W Gages and Control Units to accomplish this are now available, and Pratt & Whitney is working in close cooperation with several machine manufacturers to develop modifications in machines that will permit adjustment by gage-activated means rather than by hand.

SUCCESSFUL INSTALLATIONS ALREADY EXIST

While widespread availability of self-correcting machines must depend on further developments, there are some installations already in highly successful operation. Pratt & Whitney Control Units are being used in con-

junction with P&W Continuous Gages to provide screwdown control that automatically corrects variations in thickness of steel being cold rolled. Similar installations automatically correct the thickness of plastic coating on extruded wire. Many other types of installations are now being engineered and will soon be in operation.

ADVANTAGES ARE MANY

The advantages of self-correcting machines are many and important. Production rates are greatly increased without sacrificing accuracy; even where extreme precision is the primary consideration, greater volume and more reliable accuracy are obtained. Corrections are made without stopping the machine, thus nonproductive periods are eliminated and further increases in overall volume are realized. Rejects are greatly reduced. Gaging as a more expensive separate operation is eliminated. Where a permanent inspection record is required, automatic recording devices are readily incorporated.

HISTORY-MAKING GAGES SHOWN AT A.S.T.E. SHOW

Several of the gages that are now making self-operating machines a practical reality . . . and many others in the complete Pratt & Whitney Line . . . can be seen at Pratt & Whitney Booth No. 1531 at the A.S.T.E. Show. Included will be the newly developed syncro-transfer signal control, the new Model D Universal Internal Comparator, Air-O-Limit and Electrolimit Internal and External Clearance Calculators with Differential Computors, the new Model G Air-O-Limit Comparator, and the recently re-designed Millionth Comparator that incorporates such important improvements as a new 4-Way Magnification Switch that provides even greater versatility. Pratt & Whitney Gage Engineers will be on hand to explain all equipment and discuss individual gaging problems. Also at the Show . . . a complete display of P&W cutting tools and conventional gages.

Continuous ON-MACHINE GAGING of GROUND BAR STOCK

with

PRATT & WHITNEY

Electrolimit Gages

Developed originally for cold rolling mills, the Pratt & Whitney Electrolimit Model D Gage is here applied to continuous, on-machine gaging of precision, centerless ground bar stock. The P&W Light Signal Control with meter used in conjunction with the gage, gives a continuous, accurate reading; light signals indicate oversize or undersize. Important benefits include:

- **BETTER CONTROL OF GRINDING ACCURACY** . . . with immediate correction of machine *before* work is spoiled.
- **FASTER PRODUCTION** . . . operator continuously sees size variations due to wheel wear and makes corrections during grinding.
- **GREATER OPERATOR CONVENIENCE** . . . indicating meter is easy to read; corrections are easier, faster. Extra gaging operations are eliminated.

SEE THE ELECTROLIMIT GAGE at the A.S.T.E. SHOW
PHILADELPHIA, APRIL 26-30 — BOOTH 1531

Our Gage Engineers will be on hand to give you complete information and show you how P&W can help solve your specific gaging problems.

PRATT & WHITNEY
DIVISION NILES-BEMENT-POND COMPANY
WEST HARTFORD 1, CONNECTICUT, U. S. A.
SINCE 1860

First Choice for Accuracy

BRANCH OFFICES AND STOCK
BIRMINGHAM* · BOSTON · CHICAGO · CINCINNATI · CLEVELAND · DALLAS (The Stanco Co.) · DETROIT · LOS ANGELES · HOUSTON (The Stanco Co.) · NEW YORK · PHILADELPHIA · PITTSBURGH · ROCHESTER · SAN FRANCISCO · ST. LOUIS · EXPORT DEPT., WEST HARTFORD

MACHINE TOOLS • CUTTING TOOLS • GAGES

KELLER TOOLS "button up"

461 assemblies an hour all day long!

Two workers make a team in assembling parts for automobile horns. Above, the screws are started which attach assemblies of stacked parts to the horn yoke. At left, the two screws are run down and tightened. Both workers use Keller Pneumatic Screw Drivers, and together they assemble at the rate of 461 units per hour.

Sustained high production rates result from providing workers with easy-to-handle Keller Air Tools engineered to the job. Waste motions are eliminated, fatigue is reduced, and production speeds are maintained hour after hour.

Keller application engineers, located in principal cities from coast to coast, have the training, know-how, and experience to select the correct tool for the job. They have a much wider selection of attachments, fittings, pickups, and finders from which to choose... plus the backing of design engineers ready and able to provide special adaptations or special tools if needed.

Have you talked to the Keller man, lately?

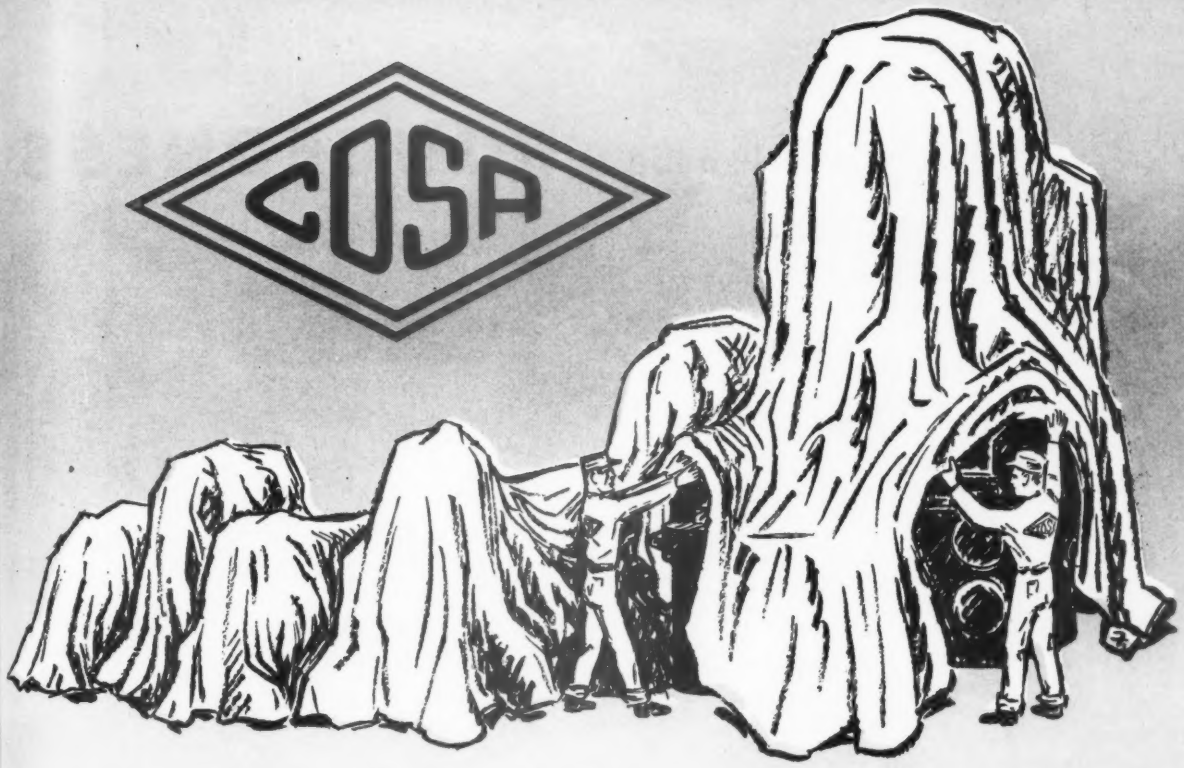
These are a few of the many Keller Screw Drivers:

KELLER
Pneumatic Tools
KELLER TOOL CO.

1313 Fulton Street
Grand Haven, Michigan

CIRCLE INFORM-A-GRAM KEY NO. 16

COSA



COSA WILL EXHIBIT 35 MACHINE TOOLS, 9 OF THEM NEW, AT THE ASTE SHOW—BOOTH 1559

We hope you get to Convention Hall, Philadelphia the week of April 26th. If you do, please visit us and see these leading Swiss and German machine tools in operation.

NEW—universal milling machine

NEW—vertical turret lathe

NEW—optical jig borer

NEW—drum-type turret lathe

NEW—multi-spindle hydro-copying milling machine

NEW—engine lathe

NEW—crankshaft balancing machine

NEW—swiss automatic with drum turret

NEW—cylindrical grinder

PLUS

DRILLS Radial, universal

AUTOMATIC FORMING MACHINES
Wire and strip, washer

WIRE STRAIGHTENING AND CUT-OFF MACHINE

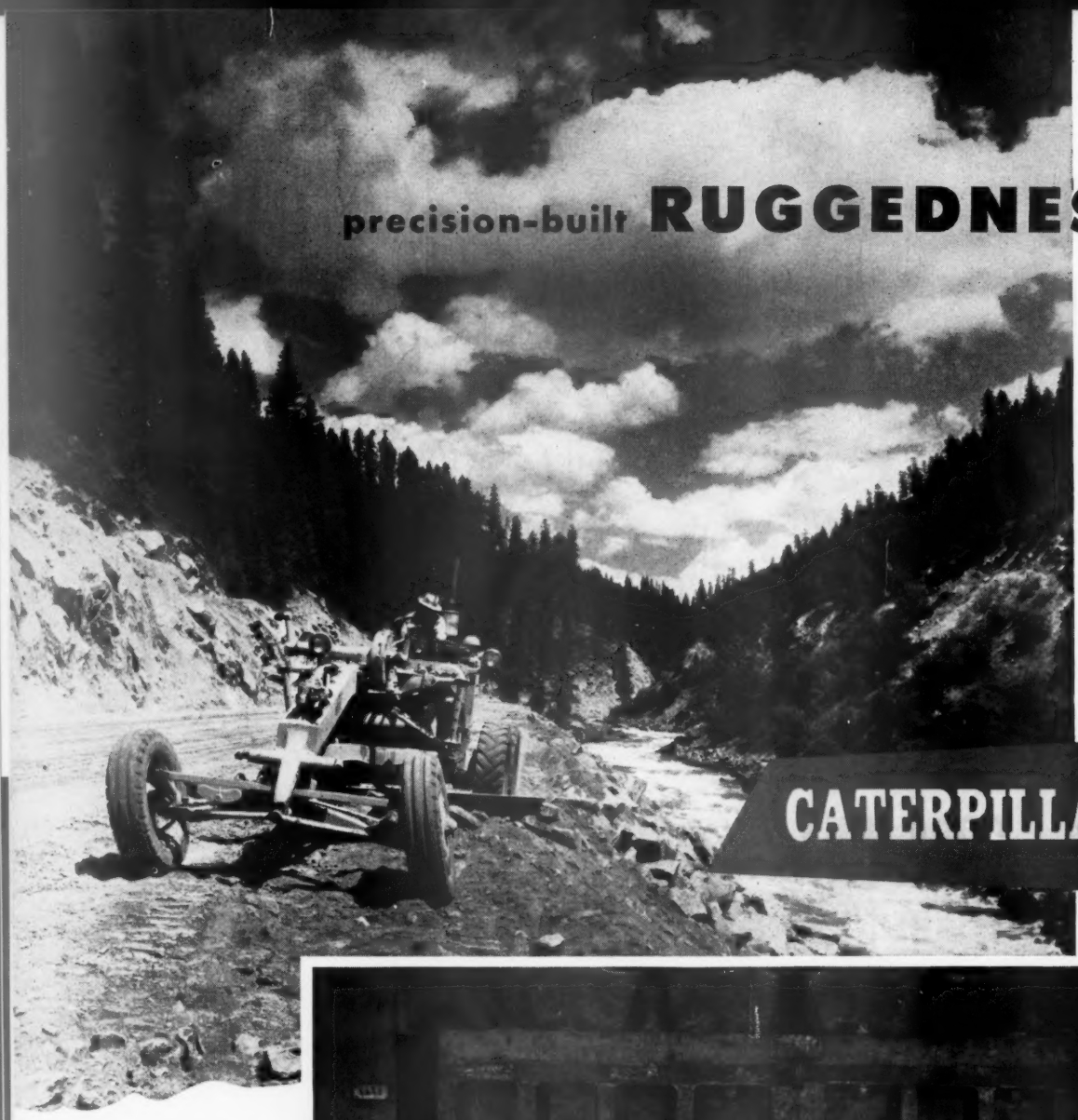
GRINDERS Gear, profile, tool and cutter

PANTOGRAPH MACHINES Die-sinkers, 2 and 3 dimensional engravers

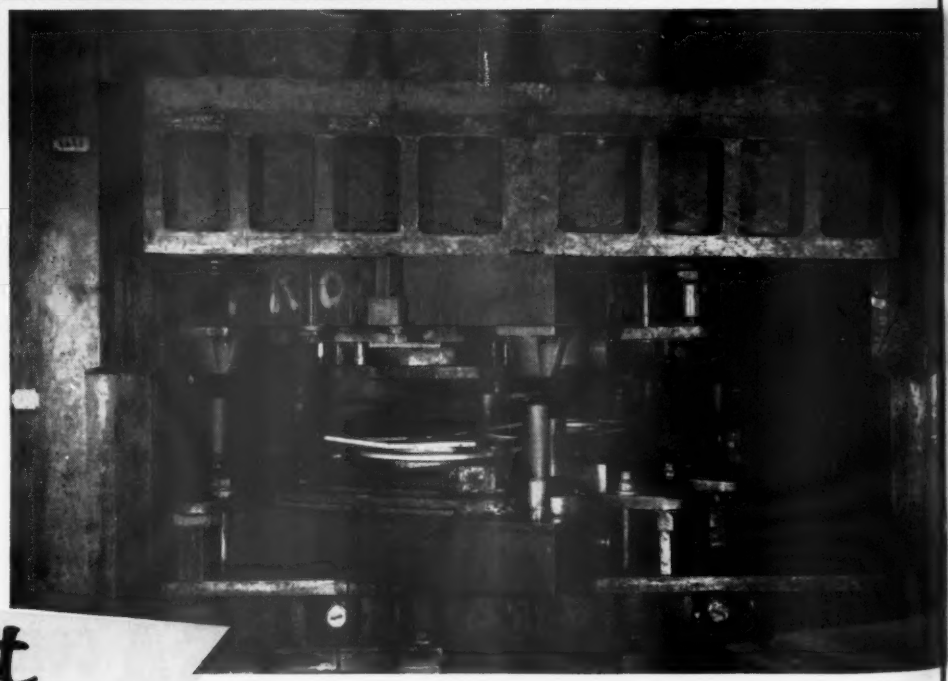
TOROIDAL COIL WINDER

INSPECTION EQUIPMENT
Mechanical comparator, electrical surface finish comparator, bench micrometer

COSA CORPORATION
405 Lexington Ave., New York 17



Caterpillar
Diesel Motor Grader
working on road
construction job
in Idaho

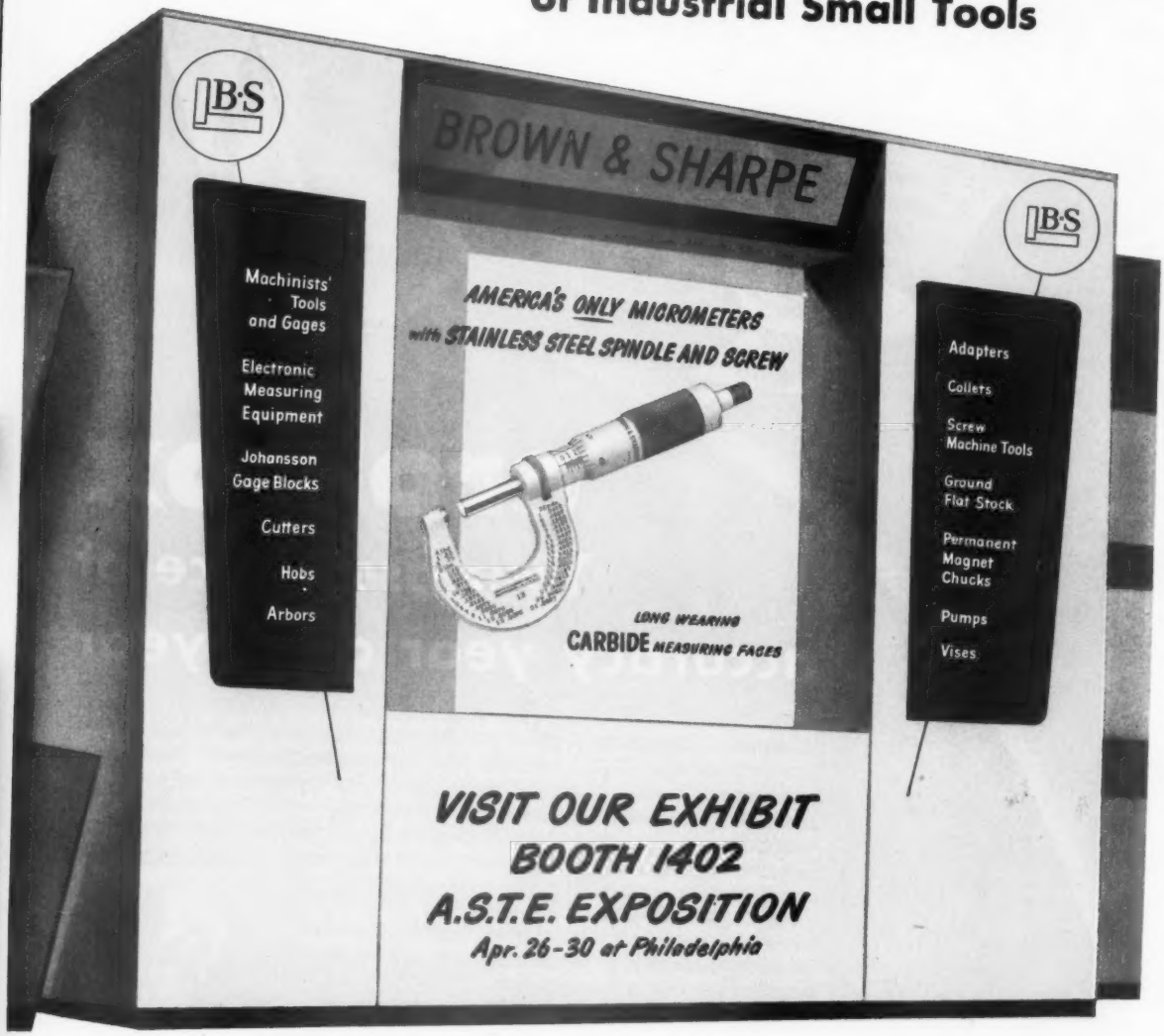


Detroit
DIE SET
CORPORATION

Special Detroit All-Steel Die Set used in stamping precision parts, Caterpillar Tractor Co., Peoria, Illinois

See

America's Most Complete Line of Industrial Small Tools



SEE OUR EXHIBIT
1954 INDUSTRIAL EXPOSITION
PHILADELPHIA CONVENTION CENTER
APRIL 26-30 incl.

featuring...

precision products that make possible the most efficient and economical production of accurate work

Brown & Sharpe

B·S

CIRCLE INFORM-A-GRAM KEY NO. 19

croblox

Your assurance of accuracy year after year

In precision manufacturing it is vitally important that the original accuracy of gage blocks be *permanent*—that they not become unreliable as a result of the wear characteristic of ordinary steel blocks. Production headaches due to such gage wear will be prevented when you use CROBLOX, Webber Gage Company's revolutionary development in gage blocks. CROBLOX (chrome carbide) gage blocks, due to their extreme hardness and resistance to corrosion, are not subject to use wear. They *remain* accurate—they give *permanent* service.

May we send you literature describing CROBLOX, the finest gage blocks made—and—your insurance against dimensional inaccuracies.

Only **WEBBER** in the U.S.A. employs Zeiss Opton Interferometer—so incredibly accurate that it detects dimensional variations as infinitesimal as .0000002 of an inch.

You are invited to visit us during the 1954 Industrial Exposition of the AMERICAN SOCIETY OF TOOL ENGINEERS
Booth Number 324
Philadelphia, April 26 to 30 inclusive

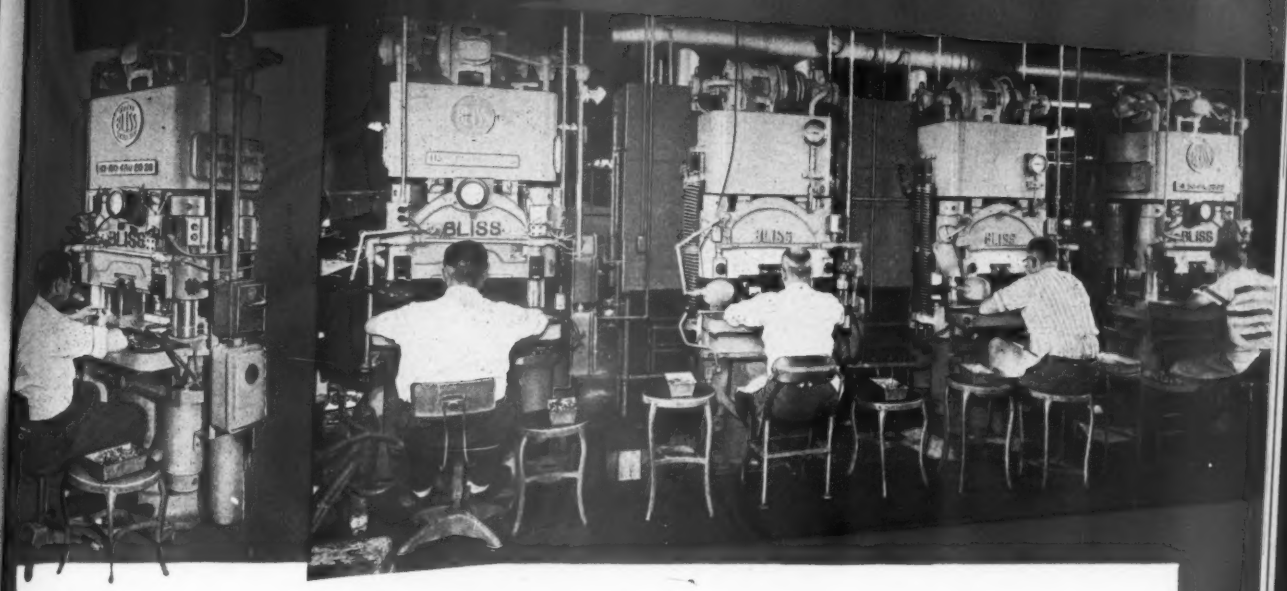
Webber
GAGE BLOCKS and ACCESSORIES

Send inquiries direct to: **WEBBER GAGE COMPANY**
12903 Triskett Road • Cleveland 11, Ohio

Largest exclusive manufacturer of precision gage blocks

CIRCLE INFORM-A-GRAM KEY NO. 20

For HYDRAULIC presses, too . . .
it pays to specify BLISS



Gruen obtains MICRO-PRECISION accuracy with

BLISS HYDRO-DYNAMIC PRESSES

Accuracy is the keynote of operations at the Gruen National Watch Case Company, Cincinnati, Ohio. This is especially true in the forming of the case itself. Here, tolerances are critical—with an exact fit of the crystal inside the watch case essential to keep it from falling out. Gruen prefers the Bliss Hydro-Dynamic presses for this job—holding tolerances to several ten-thousandths of an inch.

Equipped with high- and low-pressure pumps, these Bliss Hydro-Dynamic presses are the moving-up type . . . especially suited to industries employing sub-die processes. Their efficient, accurate operation is typical of results obtained with Bliss Hydro-Dynamic presses in all types of plants. At Gruen, *72% of the presses are Bliss-built.*

Let Bliss, the world's largest press builder, apply its long experience to *your* next press problem. Talk it over with a Bliss sales engineer. He can help you select the right press for your special requirements. Meanwhile, for more detailed information about Bliss Hydro-Dynamic presses, write for Catalog 30-A.

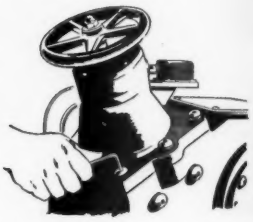
BLISS on your press is more than a name . . . it's a *guarantee*

E. W. BLISS COMPANY, Canton, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Subsidiary: The Die Supply Company, Cleveland, O. • E. W. Bliss (England) Ltd., Derby • E. W. Bliss Company (Paris) France
U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan; San Jose, Cal. *Branch Offices* in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. *West Coast Representatives:* Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. *Other representatives throughout the world.*

UNBRAKO **button head socket screws** are used exclusively to assemble this controlled volume pump, which was designed to fill the growing industrial need for the pumping of an allotted quantity of liquid at higher pressures, higher capacities.

The assembler inserts the UNBRAKO button head socket screw with his fingers, and runs it down as far as he can.



He then tightens it with a standard UNBRAKO key. Once seated, the low head design of the UNBRAKO button head provides a smooth, streamlined appearance.

UNBRAKO Button Head Socket Screws are made of heat treated alloy steel; have fully formed threads, Class 3 fit; are available in standard sizes from #8 to 5/8". Accurate hex socket provides nonslip drive, prevents marring or mutilation of the head.

Save inventory dollars

Use UNBRAKO Standards—stocked by your distributor

Not only does your UNBRAKO distributor lower inventory investment, he also saves you time—and provides latest information about products, cost-saving methods, production techniques, current problems, trade practices. For latest data on UNBRAKO standard socket screw products, consult him or write STANDARD PRESSED STEEL COMPANY, Jenkintown 36, Pennsylvania.

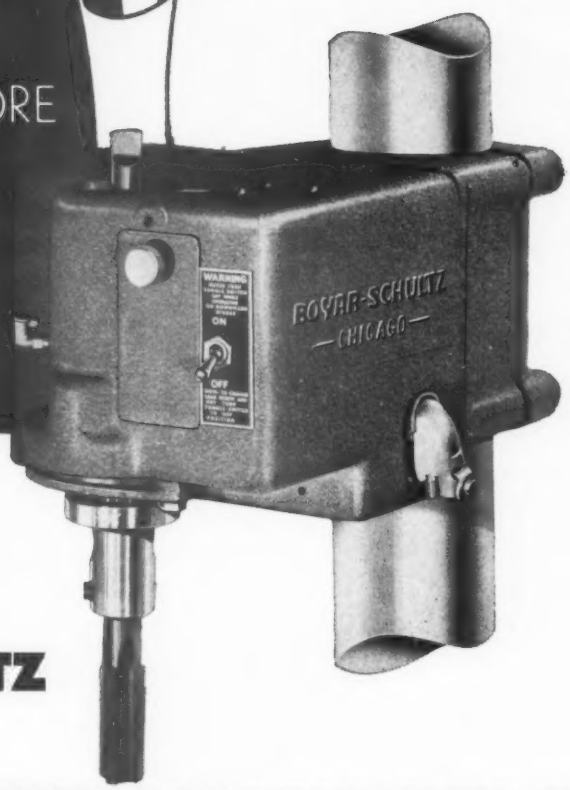
See us at Booth 1539, Convention Hall, Philadelphia, Pa., during the A.S.T.E. Show, April 26 to 30.

UNBRAKO® SOCKET SCREW DIVISION

SPS JENKINTOWN PENNSYLVANIA

CIRCLE INFORM-A-GRAM KEY NO. 22

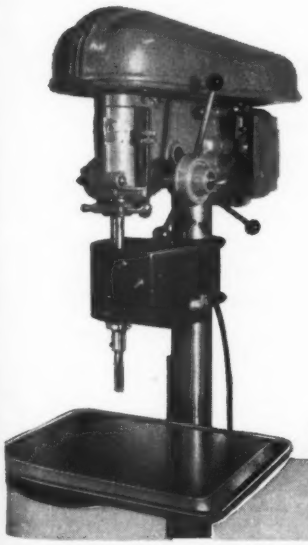
YOU GET MORE
FROM YOUR
DRILL PRESS
with



the **NEW**
BOYAR-SCHULTZ

LEAD SCREW TAPPING ATTACHMENT

Change Your Ordinary Drill Press To a Precision Tapping Instrument in Minutes



Quickly and easily fitted to your drill press, it makes an efficient Tapping Attachment that can produce any thread including Class 4.

No special skill required for operation. Anyone familiar with a drill press can consistently produce accurate threads.

Foot control switch leaves hands free for loading work. Built in reversing switch actuates drill press motor, eliminating need for any intermediate reversing device.

Long, trouble-free life of bronze nut and ground thread Lead Screw is assured, because of their generous 1¾" diameters.

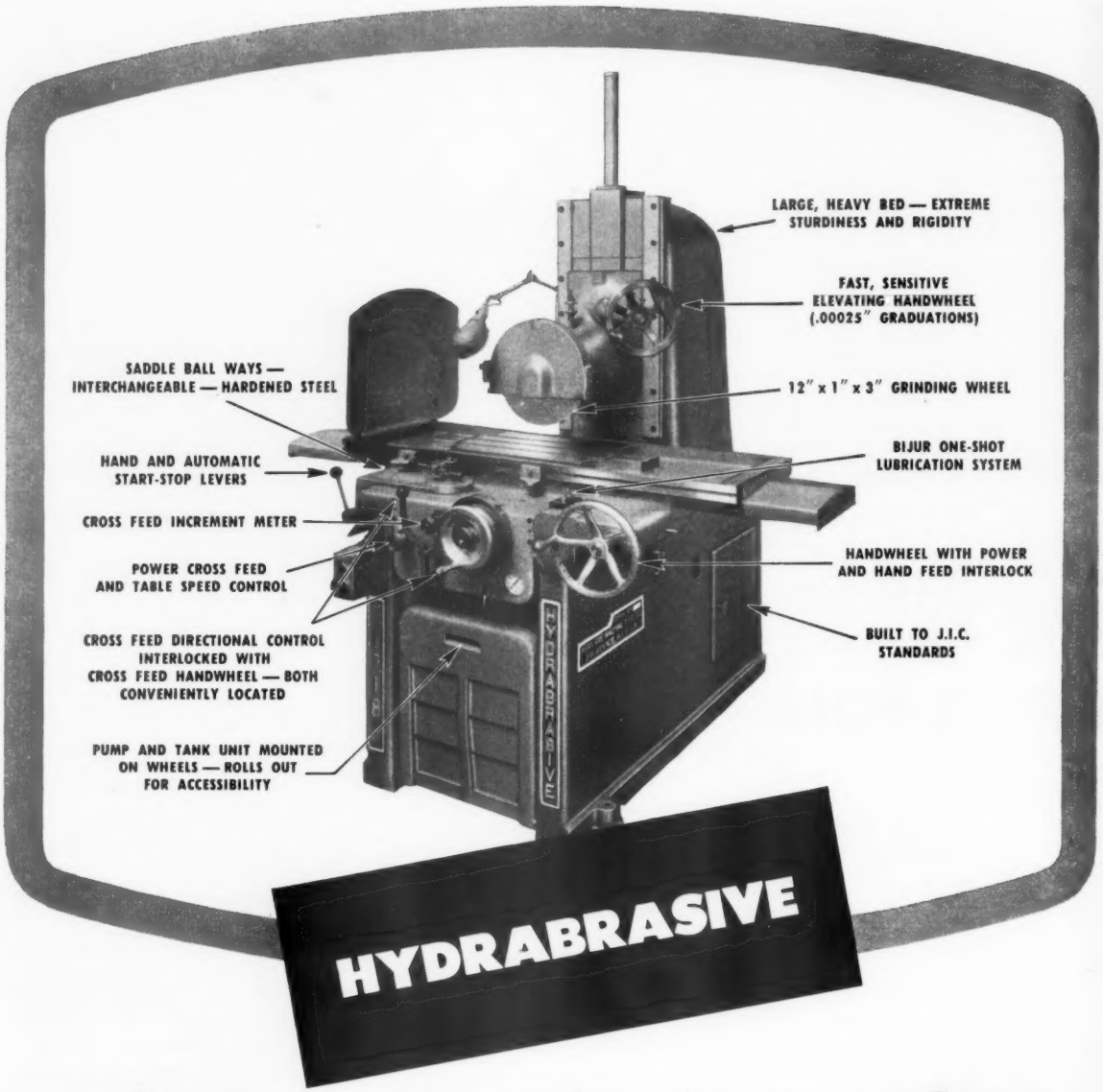
Extreme accuracy in control of tapped hole depth is assured by electrically controlled reversing switches.

All taps up to ⅞" diameter usable with standard adapter bushings. Adapters for taps from $\frac{15}{16}$" to 2" available on special order.

Write for Descriptive Literature

BOYAR-SCHULTZ CORPORATION
2112 Walnut Street DEPT. C.-T. Chicago 12, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 23


LARGE, HEAVY BED — EXTREME STURDINESS AND RIGIDITY
FAST, SENSITIVE ELEVATING HANDWHEEL (.00025" GRADUATIONS)
SADDLE BALL WAYS — INTERCHANGEABLE — HARDENED STEEL
12" x 1" x 3" GRINDING WHEEL
HAND AND AUTOMATIC START-STOP LEVERS
BIJUR ONE-SHOT LUBRICATION SYSTEM
CROSS FEED INCREMENT METER
HANDWHEEL WITH POWER AND HAND FEED INTERLOCK
POWER CROSS FEED AND TABLE SPEED CONTROL
BUILT TO J.I.C. STANDARDS
CROSS FEED DIRECTIONAL CONTROL INTERLOCKED WITH CROSS FEED HANDWHEEL — BOTH CONVENIENTLY LOCATED
PUMP AND TANK UNIT MOUNTED ON WHEELS — ROLLS OUT FOR ACCESSIBILITY
HYDRABRASIVE
HYDRABRASIVE

...feature attraction in any plant

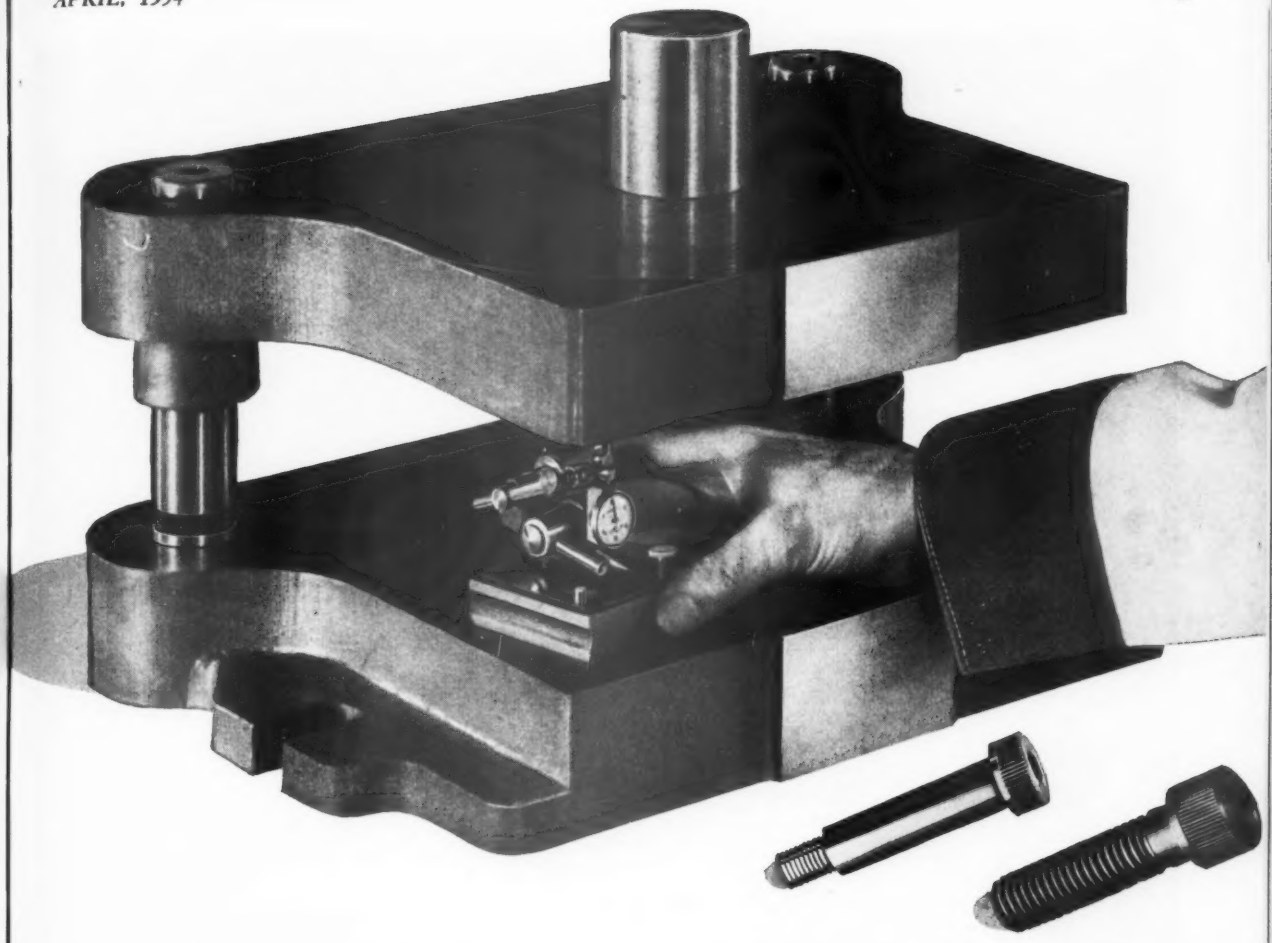
The new 1218 Hydrabrasive Surface Grinder is a stand-out performer. It's big, rugged, accurate — packed with important features that mean better output and lower costs.

Hydraulic operation of the No. 1218 is *faster* . . . provides table speeds from ½ foot per minute to 90 feet per minute, with ⅜" of cross feed movement in 1/5 of a second! The No. 1218 is *super-powered.* A 3 HP fan-cooled fully enclosed spindle motor drives the 12" wheel with extra cutting capacity for all work from crush grinding to conventional grinding. No. 1218 provides *wide cross travel* (12") with *moderate table length* (18") — a deep, massive base, saddle ball ways of hardened steel for precision transverse adjustment, plus many other exclusive features. For complete information address Abrasive Machine Tool Co., 16 Dunellen Road, East Providence 14, Rhode Island. Distributors Throughout the World.

ABRASIVE
ACCURACY BOOSTS PRODUCTION

Abrasive Quality is Reflected in the Finish of Your Product

CIRCLE INFORM-A-GRAM KEY NO. 24



DIEMAKERS DEPEND ON DANLY FOR DIE SET ACCURACY

When it comes to meeting the precision requirements of the finest die work, diemakers everywhere *depend on Danly* Die Sets and Danly Diemakers' Supplies for accuracy. Precision machining, grinding, lapping and honing provide smooth, long-wearing surfaces with dimensional accuracy held within extremely close tolerances. On every component part, rigid inspection standards guard Danly quality.

Danly accuracy saves countless hours in the die shop, makes tooling-up much faster, insures longer production runs at lower cost. Why not bring Danly into your diemaking plans and get the results you're looking for. Remember, there's a Danly Branch near you. They're stocked for immediate delivery.

Call Your Local Danly Branch Today!

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DANLY®

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois

DIE SETS AND DIEMAKERS SUPPLIES

You won't want to miss the Danly Exhibit at the A. S. T. E. Show in Philadelphia, April 26-30. We'll be at Booth No. 1601

CIRCLE INFORM-A-GRAM KEY NO. 25

NEW
Allen leader point cap screws
Dropping, knocking against metal surfaces and faulty line-up are major causes of damaged threads. Allen's new unthreaded leader point substantially reduces the causes of screw thread injury, or damage to threaded holes. Grip Heads, precision fit sockets that adhere to the key, plus the new leader points, make Allens the world's easiest starting cap screws, particularly in inaccessible spots. Sold only thru leading Industrial Distributors.
ALLEN HEAD
ALLEN
MANUFACTURING COMPANY
Hartford 2, Connecticut U.S.A.

CIRCLE INFORM-A-GRAM KEY NO. 26

UNI-V-BLOCK

the perfect mate for all fine instruments of standards

Yes, this is the new precision tool that you must have to complement the accuracy of your master gage blocks, super micrometers and all other fine instruments of standards.

UNI-V-BLOCKS are made of forged, close-grained Chrome-Moly alloy steel. The exclusive, new FROZONE process for hardness and stability (developed by Precision Tool) makes UNI-V-BLOCKS *the closest thing to absolute perfection*, on the market today!

WRITE NOW FOR FREE LITERATURE! FIND OUT HOW THE NEW, FULLY GUARANTEED UNI-V-BLOCKS WILL IMPROVE QUALITY AND SAVE MONEY IN YOUR PLANT.

IF YOUR WORK REQUIRES PRECISION AND MASS PRODUCTION INTERCHANGEABILITY YOU NEED UNI-V-BLOCKS!

Shown here is MODEL 3000 (2 7/32 x 3 3/4 x 2 15/16")
UNI-V-BLOCKS are also available as:
MODEL 5000 (4 5/16 x 5 1/8 x 5 3/4")
MODEL 1250 (1 1/4 x 1 1/4 x 1 3/8")

UNI-V-BLOCKS ARE ACCURATE TO WITHIN .0002" T.I.R.

PRECISION TOOL & MFG. CO. OF ILLINOIS
1305 S. Laramie Ave., CICERO 50, Ill. TP-4
Gentlemen: Please send me complete information on the new UNI-V-BLOCKS

NAME

COMPANY

ADDRESS

CITY ZONE STATE

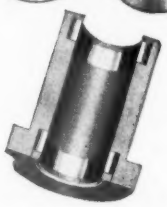
PRECISION TOOL & MFG. CO. OF ILLINOIS
1305 S. Laramie Ave., CICERO 50, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 27

DOUBLE BARRELLED SAVINGS with MEYCO carbide application "Know How"

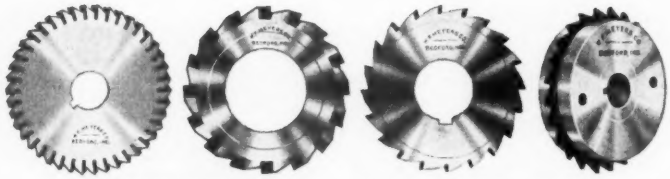
MEYCO
CARBIDE INSERTED DRILL JIG BUSHINGS

The most practical bushing ever made for high production and maximum accurate life, at lowest unit cost.



MEYCO
CUSTOM CARBIDE TOOLING

Precision made for more production per grind. Meyco production and engineering skill makes the difference. Made to your specifications—inquiries invited for prompt quotation.



MEYCO PRECISION CIRCULAR CUTTERS

For grooving, slitting, commutator undercutting and other operations to meet the requirements of your own individual applications: Solid carbide or carbide tipped.

SEND MORE INFORMATION ON

- ☐ Meyco Carbide Inserted Drill Jig Bushings
- ☐ Meyco Precision Circular Cutters
- ☐ Meyco Custom Carbide Tooling

NAME_____

COMPANY_____

ADDRESS_____

W. F. MEYERS CO., INC.
FAMOUS FOR PRECISION TOOLS SINCE 1885
BEDFORD, INDIANA

Our Engineering Department will gladly submit suggestions . . . we make your problem our problem.

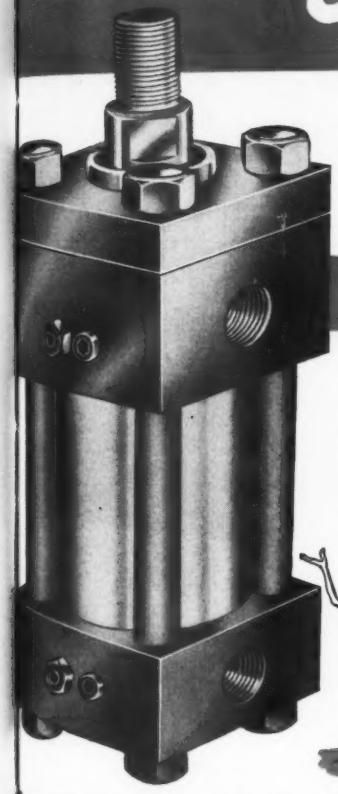
CIRCLE INFORM-A-GRAM KEY NO. 28

Augmenting Miller's Quality-Famous Line of "Custom-Built" Cylinders...

Miller Stock AIR AND HYDRAULIC CYLINDERS

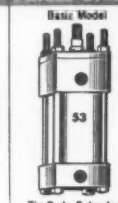
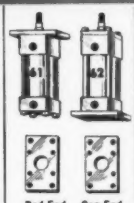
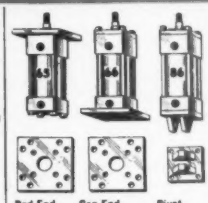
Available for *Immediate Delivery*...

in the popular sizes, mountings and prices listed below



Any of the interchangeable mountings illustrated can be easily attached to Basic Model 53 by tie rod nuts in a few moments by any customer. This gives you a wide selection of models for original equipment and for convenient re-use with other mounting attachments to simplify your "stock" and maintenance problems.

ORDER DIRECTLY FROM THIS LIST...
"Stock" Cylinders are shipped as Basic Model 53. Your selection of Mounting Attachments are shipped (unattached) with cylinders. Prices are F.O.B. our plant.

			BASIC CYLINDER PRICES ONLY		PRICES OF MOUNTING ATTACHMENTS ONLY					
			 Basic Model 53 — Tie Rods Extended Rod End		71 — Side or Foot Mounting; 77 — Foot Mounting		 61 — Rod End Flange; 62 — Cap End Flange		 65 — Rod End Flange; 66 — Cap End Flange; 86 — Pivot Mounting	
Bore	Stroke	Cushion	AIR A53	HYD. H53	AIR A77 A71	HYD. H77 H71	AIR A61 A62	HYD. H61 H62	AIR A86	HYD. H65 H66 H80
1½"	2"	Non		$58.50		$2.90		$8.20		$14.35
1½"	4"	Non		60.70		2.90		8.20		14.35
1½"	6"	Non		62.90		2.90		8.20		14.35
1½"	8"	Non		65.10		2.90		8.20		14.35
1½"	11"	Non		68.40		2.90		8.20		14.35
2"	2"	Non	$37.70		$2.05		$4.60		$6.90	
2"	4"	Non	39.40		2.05		4.60		6.90	
2"	6"	Non	41.10		2.05		4.60		6.90	
2"	8"	Non	42.80		2.05		4.60		6.90	
2"	11"	Non	45.35		2.05		4.60		6.90	
2"	3"	Both	62.05	94.50	2.05	2.95	4.60	8.55	6.90	17.05
2"	5"	Both	63.75	97.00	2.05	2.95	4.60	8.55	6.90	17.05
2"	7"	Both	65.45	99.50	2.05	2.95	4.60	8.55	6.90	17.05
2"	9"	Both	67.15	102.00	2.05	2.95	4.60	8.55	6.90	17.05
2"	13"	Both	70.55	107.00	2.05	2.95	4.60	8.55	6.90	17.05
2½"	2"	Non	41.45	73.30	2.25	2.95	4.80	9.00	7.55	19.80
2½"	4"	Non	43.35	76.00	2.25	2.95	4.80	9.00	7.55	19.80
2½"	6"	Non	45.25	78.70	2.25	2.95	4.80	9.00	7.55	19.80
2½"	8"	Non	47.15	81.40	2.25	2.95	4.80	9.00	7.55	19.80
2½"	11"	Non	50.00	85.45	2.25	2.95	4.80	9.00	7.55	19.80
3¼"	3"	Both	77.80	126.85	2.55	4.35	6.35	11.75	9.90	23.10
3¼"	5"	Both	79.80	129.85	2.55	4.35	6.35	11.75	9.90	23.10
3¼"	7"	Both	81.80	132.85	2.55	4.35	6.35	11.75	9.90	23.10
3¼"	9"	Both	83.80	135.85	2.55	4.35	6.35	11.75	9.90	23.10
3¼"	13"	Both	87.80	141.85	2.55	4.35	6.35	11.75	9.90	23.10
4"	2"	Non	56.25	106.00	2.85	5.15	6.70	12.90	11.05	26.80
4"	4"	Non	58.85	109.40	2.85	5.15	6.70	12.90	11.05	26.80
4"	6"	Non	61.45	112.80	2.85	5.15	6.70	12.90	11.05	26.80
4"	8"	Non	64.05	116.20	2.85	5.15	6.70	12.90	11.05	26.80
4"	11"	Non	67.95	121.30	2.85	5.15	6.70	12.90	11.05	26.80
5"	3"	Both	98.25		3.15		7.00		12.35	
5"	5"	Both	101.65		3.15		7.00		12.35	
5"	7"	Both	105.05		3.15		7.00		12.35	
5"	9"	Both	108.45		3.15		7.00		12.35	
5"	13"	Both	115.25		3.15		7.00		12.35	
6"	2"	Non	80.60		3.35		7.25		13.55	
6"	4"	Non	84.90		3.35		7.25		13.55	
6"	6"	Non	89.20		3.35		7.25		13.55	
6"	8"	Non	93.50		3.35		7.25		13.55	
6"	11"	Non	99.95		3.35		7.25		13.55	
8"	3"	Both	157.35		3.70		10.55		17.60	
8"	5"	Both	162.45		3.70		10.55		17.60	
8"	7"	Both	167.55		3.70		10.55		17.60	
8"	9"	Both	172.65		3.70		10.55		17.60	
8"	13"	Both	182.85		3.70		10.55		17.60	

Miller "Stock" Cylinders fully meet the J.I.C. standards and are identical to Miller "Custom-Built" Cylinders in design and construction.

"Stock" Air Cylinders are for 200 psi operation, "stock" hydraulic cylinders for 2000-3000 psi operation. Piston Rods of "Stock" Cylinders are "Style No. 2 Standard."

For complete descriptive and dimensional data on both "Stock" and "Custom-Built" Miller Cylinders, write for Bulletins A-105 and H-104 sent FREE on request.

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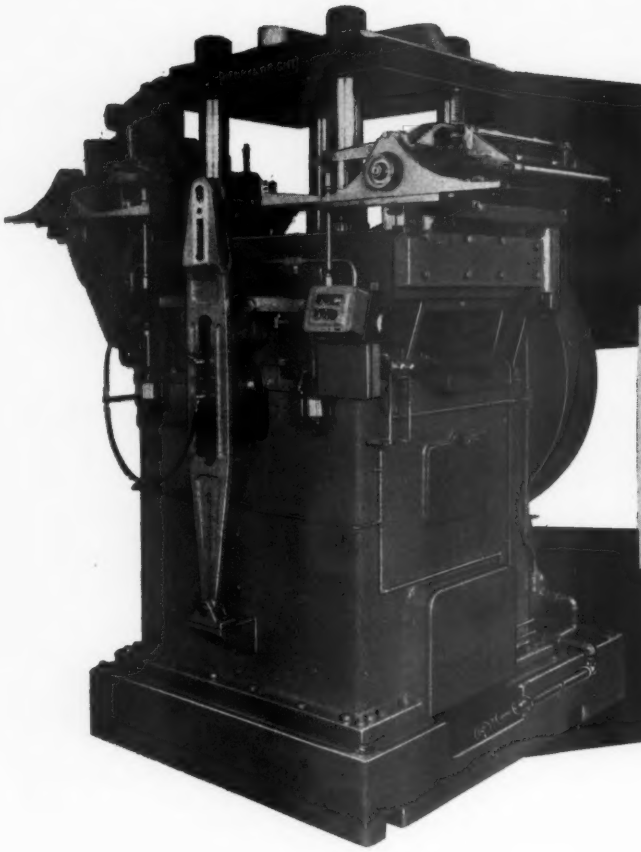
MILLER FLUID POWER CO.
(formerly MILLER MOTOR COMPANY*)*

Miller **2046 N. Hawthorne Ave. Melrose Park, Ill.**

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS



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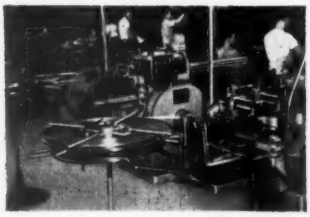
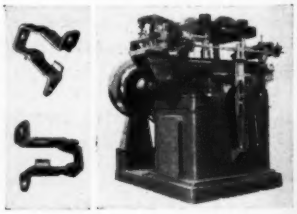
If you have to produce more in a given time — the proven answer is a Henry & Wright Dieing Machine. Here is the capacity that enables you to keep pace with sudden scheduling changes; the consistent accuracy that permits you to set and automatically meet higher standards of work quality, while reducing cost.

In the Henry & Wright Dieing Machine, you have a production tool designed for high speed, built to widen radically the practical application of progressive stamping and engineered to prolong the life of your dies. Outstanding in its application for light and medium gauge metals, the Dieing Machine is also demonstrating that it can achieve equally extraordinary results in stamping and forming heavy gauge parts.

You owe it to yourself to include the Henry & Wright Dieing Machine in your plans for modernization, expansion or replacement. We welcome an opportunity to discuss its specific application to your requirements.



25-ton Henry & Wright Dieing Machines with twin die set-ups produced 435 parts per minute per machine at Barber-Colman.



250-ton Henry & Wright Dieing Machine producing 54 completed hinge boxes per stroke from 5/32" x 13" steel in coil form.

ONE SET UP INSTEAD OF MANY WITH H&W DIEING MACHINES

HELPFUL DATA *is available in our fact-packed catalog which you can have by writing Henry & Wright, 511 Windsor St., Hartford, Connecticut.*

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

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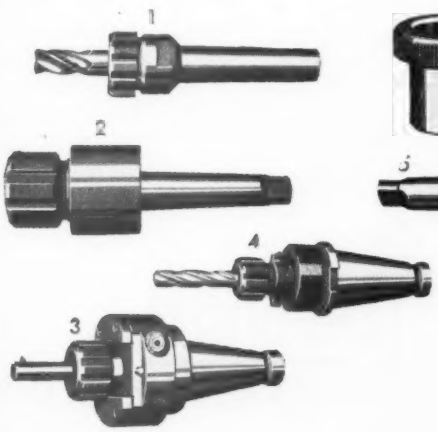
CIRCLE INFORM-A-GRAM KEY NO. 30

UNIVERSAL DRILL BUSHINGS OUTLAST THEM ALL!

Several factors contribute to the long life of Universal Drill Bushings. They are machined from an unusually high quality steel. Their superhoned bores reduce wear. The blended radius on the top inside diameter helps prevent tool hang-up and breakage. 100% concentricity and hardness tests help guarantee their accuracy and uniform quality. Knurled heads provide a quick, sure grip. Available in a complete range of standard sizes and lengths. Orders for special dimensions will receive prompt attention. For complete information, write to the office nearest you — Universal Engineering Sales Co., 1060 Broad St., Newark 2, N. J.; 5035 Sixth Ave., Kenosha, Wis. — or our home office.

180

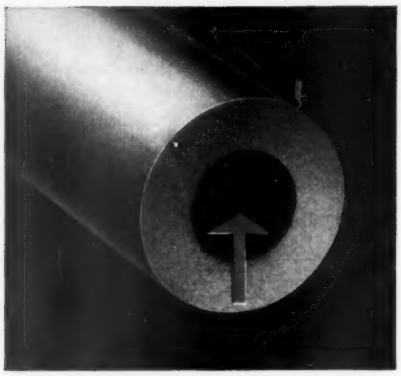
UNIVERSAL ENGINEERING COMPANY
FRANKENMUTH 8, MICHIGAN



1 STANDARD COLLET CHUCK
2 FLOATING COLLET CHUCK
3 BORING CHUCK
4 "KWIK-SWITCH" TOOL HOLDER
5 MIKRO-LOK BORING BAR
6 STANDARD DRILL BUSHING
7 UNIVERSAL INDEX PLUNGER

CIRCLE INFORM-A-GRAM KEY NO. 31

a hole here makes waste...



a hole here makes a saving

Crucible Hollow Tool Steel Bars **are a boon to the metalworking industry. The hole in these quality bars enable toolmakers to eliminate drilling, boring, cutting-off and rough-facing operations. This cuts production time, boosts machine capacity and saves scrap losses.**

They are available now, in any of Crucible's famous tool steel grades, in almost any combination of O.D. and I.D. sizes. And you can get *immediate* delivery of five popular grades — KETOS oil-hardening, SANDERSON water-hardening, AIRDI 150 high carbon-high chromium, AIRKOOL air-hardening, and NU DIE V hot-work tool steels — from a conveniently located Crucible branch warehouse.

Let your Crucible representative show you how these steels can best help *you*.

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **HOLLOW TOOL STEEL**

CRUCIBLE STEEL COMPANY OF AMERICA • TOOL STEEL SALES • SYRACUSE, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 32

Close-Up Look Tells Why... THE NEW 12" SWING LOGAN LATHE

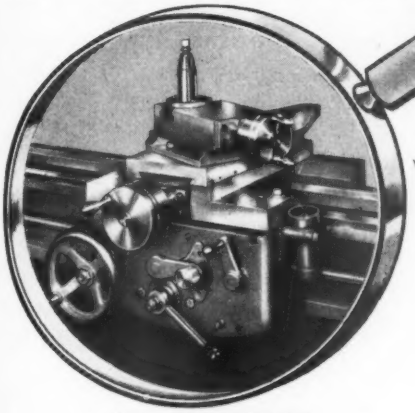
DELIVERS PLUS PERFORMANCE

The HEADSTOCK Is Massive, Rigid, Convenient

Massively proportioned spindle means extreme rigidity on heavy cuts. Oversize ball bearing mounting assures sustained spindle accuracy. Outboard V-belt drive transmits power with maximum efficiency and simplifies belt changing or adjustment. Accessible gear-shift knobs add to operating convenience and safety.

For Production, Maintenance, Tool Room or School Shop

"See this Lathe—and the Variable Speed Drive Model—Booth 908 — A. S. T. E. Show"



The CARRIAGE Is Newest, Finest Construction

Simple, lever-operated disc type clutch gives new operating convenience. Easily read, widely separated graduations on the extra large dials permit accurate readings. Precision ground top surfaces on cross slide and saddle permit mounting fixtures and use of magnetic indicators. Extra wide and long bearing surfaces on cross feed slide. Heavy, massive compound for rigidity. Apron operates in bath of oil.

The closer you inspect this new 12" swing Logan Lathe, the *better* it looks. The advanced design of individual parts, and the precision construction throughout become more evident. You will like the size, too. Its 35" center distance, 1⅜" spindle hole, 1" collet capacity, and rugged, massive proportions mean extra capacity, stability and power. Keep this newest Logan in mind as you make plans for your production line, tool room, shop, or student training program. The quality you see in your close-up look will serve you well through extra years.

SEE IT AT YOUR LOGAN LATHE DEALER'S, OR

Write for Information...

Full catalog descriptions and price information on request. ***Write today to***

Logan ENGINEERING CO. Lawrence and Lamon Avenues

Brief Specifications of Logan 12" Lathes

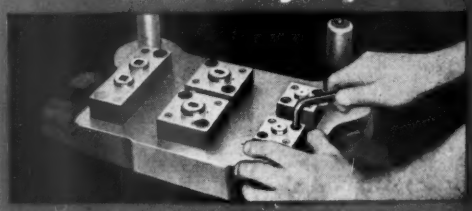
Swing over bed and saddle wings, 12"... Center Distances, 23" and 35"... Turret Lathes Models have 43" bed length... 1⅜" spindle hole... 1" collet capacity... 16 spindle speeds, 38 to 1260 rpm.

LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

CIRCLE INFORM-A-GRAM KEY NO. 33

WHERE R-B Punches cut your costs

in die designing



in die construction

in die operation

IN DIE DESIGNING

. . . you save "board time" by working with the standardized R-B concept of punches, die buttons, punch retainers and die button retainers. R-B standardized equipment reduces drafting time to cut your costs.

IN DIE CONSTRUCTION

. . . you save "building time" because R-B punches, die buttons, punch retainers and die button retainers are furnished completely finished. R-B saves skilled die-maker's time to cut your costs.

IN DIE OPERATION

. . . you save "press time" because R-B punches and die buttons are instantly removed and replacements quickly inserted. Inherent accurate alignment and positive locking keep press down-time at a minimum to cut your costs.

Use R-B Engineering Service for Your Tough Piercing Problems.

RICHARD BROTHERS PUNCH DIVISION
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STANDARD CAP SCREWS
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Make Your
Short-run Jobs
Profitable...
. . . Brown & Sharpe Hand Screw Machines. There's real economy in handling small quantity bar-stock and second-operation work on a No. 00, No. 0, or No. 2 Hand Screw Machine. Rush jobs, that might otherwise disrupt your automatic production, can be quickly dispatched . . . and at a *profit*, too. Moreover, tooling is economical. These Hand Screw Machines use the same collets, fingers, and many of the tools used on the Automatics. Write for Bulletins which fully describe the high-efficiency features of these three Hand Screw Machines.
Brown & Sharpe

America's Only Micrometers
with Stainless Steel Spindle and Screw!
New Brown & Sharpe Micrometers give you complete protection from rust and stain—the common causes of excessive wear and loss of reading accuracy. Exclusive stainless steel, one-piece spindle and screw with hardened and ground threads is permanently rust-proof. Dull chrome frame and thimble resist acid perspiration and other causes of stain. Many other quality features, such as carbide measuring faces, give these new micrometers long lasting accuracy—make them easier to use. Write for Catalog 35M and read all about the hundreds of precision hand tools made by Brown & Sharpe.
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Milling Machines • Grinding Machines • Screw Machines • Cutters • Machine Tool Accessories
Machinists' Tools • Electronic Measuring Equipment • Johansson Gage Blocks
Permanent Magnet Chucks • Pumps
Printed in U.S.A.

For Years, Milne Has Been Delivering Hollow Die Answers To Tooling Problems..*

*All are Genuine Tool Steels

GRAPHITIC
HOLLOW DIE STEEL
Widest Range Of Applications Including forming, drawing, sizing, flanging, embossing, and combination dies, work support blades, forming rolls, steel mill straightening rolls, machine parts, plug, thread and ring gauges, cams, bushings, sleeves, mandrels, fixtures and other applications.

NOW MILNE has the answer to a diemaker's dream!

- MINIMIZES MACHINING
- CUTS WASTE
- PRODUCES SUPER WEAR-RESISTANT, NON GALLING TOOLS

JIC-06 . . . Oil Hardening, Non-Deforming . . . Full Length Kolorkoted Pink and Gray for Permanent Identification

This new combination of Timken Graphitic Steel features in Hollow Die (Tubular Tool) form is Milne's latest bee-line to better, lower-cost tooling.

Has a double advantage over standard oil hardening tool steels.

1. Free graphite makes it the fastest, easiest machining tool steel in tubular form and insures non-seizing properties.
2. Diamond-hard carbide particles guarantee super wear resistance.

Rough turned O.D. and I.D. Saw cut faces. Furnace annealed – no scale. Cut to any length.

Stocks of a range of sizes being built to meet demand. Write for a stock list and Milne's new Hollow Die Catalog section.

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America's Leading Tool Steel Specialists
Complete Line Of Tool Steels—Hot or Cold Rolled

BE SURE TO SEE THE NEW MILNE EXHIBIT BOOTH 429—A. S. T. E. SHOW—PHILA.—APRIL 26-30

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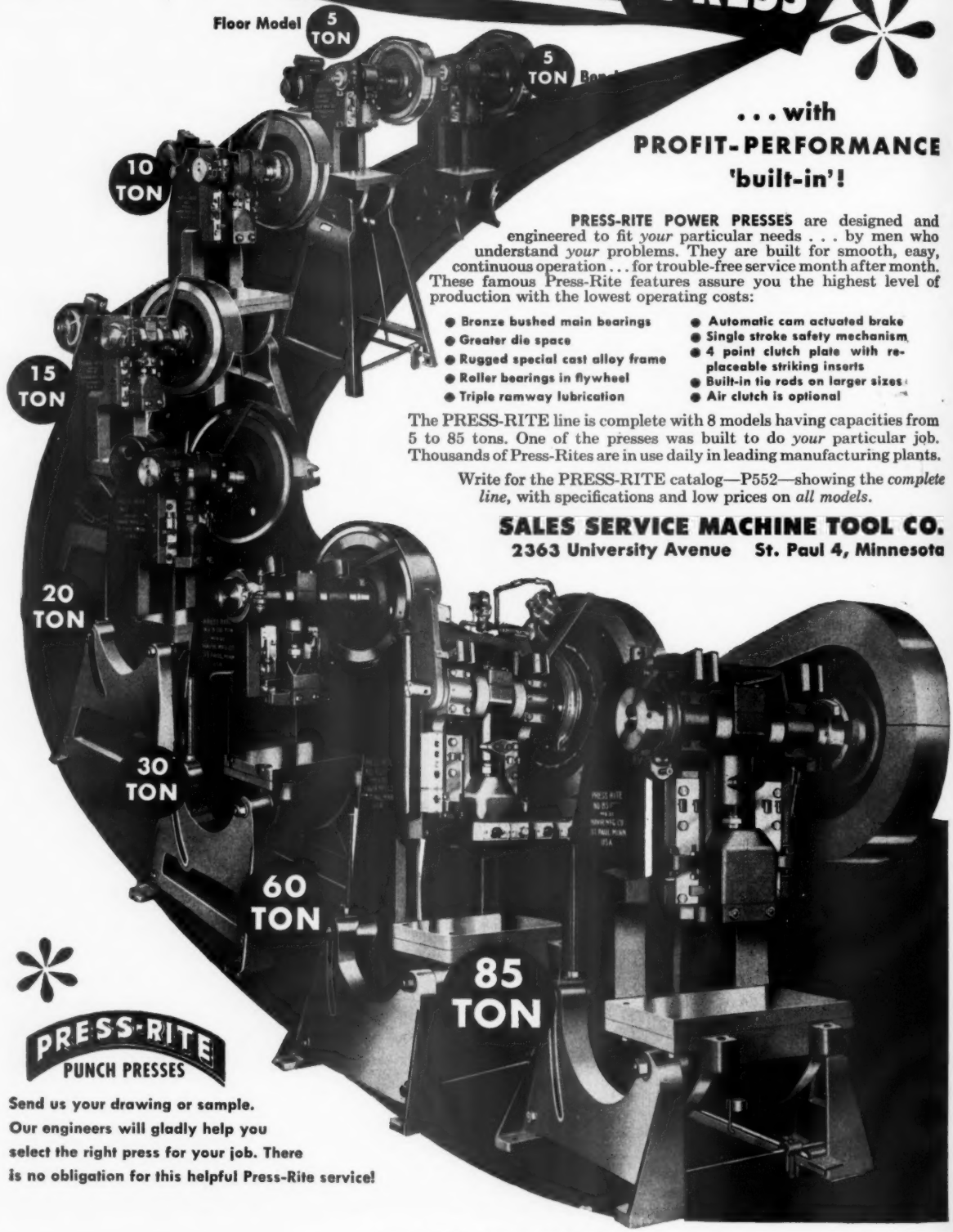
SELECT THE RIGHT PRESS



. . . with PROFIT-PERFORMANCE 'built-in'!

PRESS-RITE POWER PRESSES are designed and engineered to fit *your* particular needs . . . by men who understand *your* problems. They are built for smooth, easy, continuous operation . . . for trouble-free service month after month. These famous Press-Rite features assure you the highest level of production with the lowest operating costs:

- Bronze bushed main bearings
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- Single stroke safety mechanism
- 4 point clutch plate with replaceable striking inserts
- Built-in tie rods on larger sizes
- Air clutch is optional

The PRESS-RITE line is complete with 8 models having capacities from 5 to 85 tons. One of the presses was built to do *your* particular job. Thousands of Press-Rites are in use daily in leading manufacturing plants.

Write for the PRESS-RITE catalog—P552—showing the *complete line*, with specifications and low prices on *all models*.

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2363 University Avenue St. Paul 4, Minnesota

PRESS-RITE PUNCH PRESSES

Send us your drawing or sample. Our engineers will gladly help you select the right press for your job. There is no obligation for this helpful Press-Rite service!

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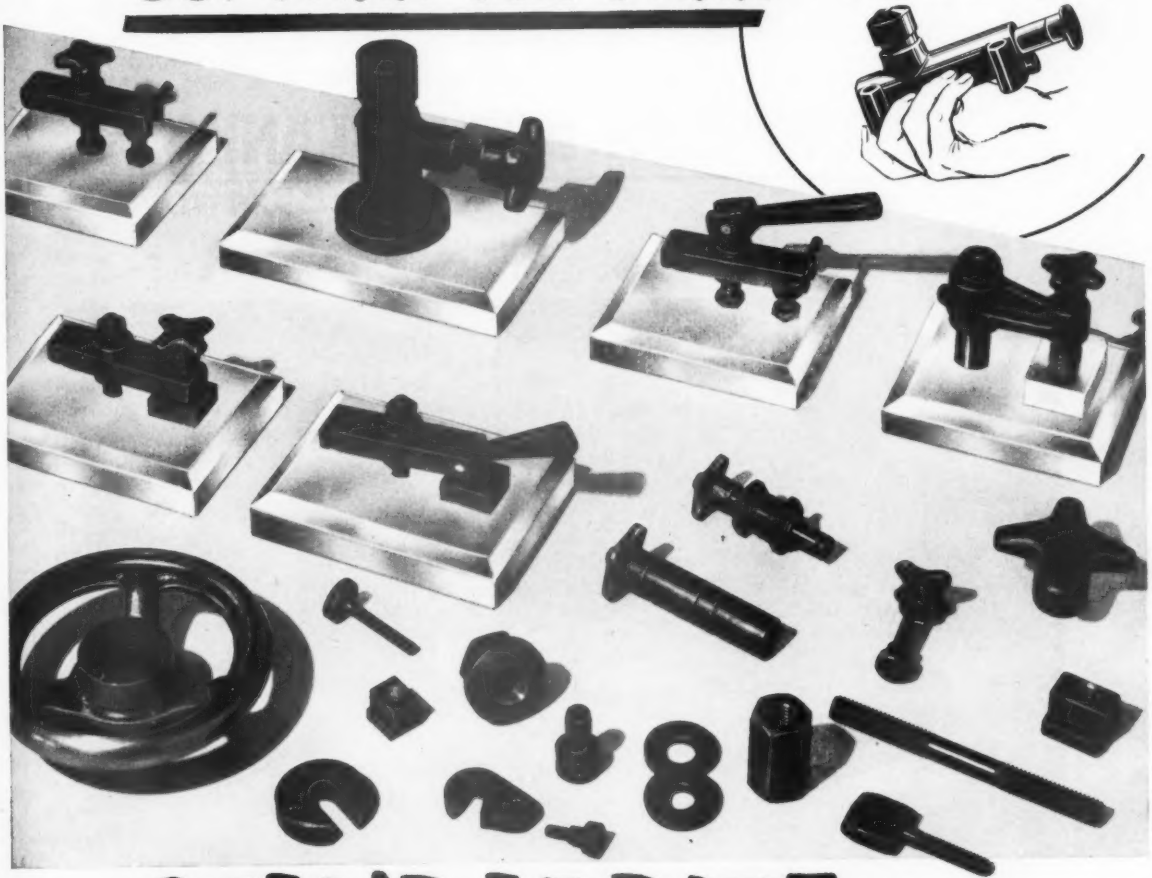
In Jig and Fixture Components . . .

Get What You Want

With the recent addition of such new items as this heavy-duty jack with working parts of hardened-tool steel, Lodding now offers the most complete line of standard jigs and fixtures available.



STANDARDIZE With

YOU GET THE BEST

All Lodding fixtures are carefully engineered and quality-built to provide long, reliable service. Forgings and powdered metal are used in many cases. Every Lodding fixture is Parkerized to prevent rust.

AND YOU GET IT QUICKLY

Immediate shipment from completely stocked, coast-to-coast distributors. You receive parts much faster than you can make them yourself.

Lodding INC.

81 BEACON ST., WORCESTER 1, MASS.

THE LINE OF JIG AND FIXTURE COMPONENTS

Write for Catalog — *includes full-scale layouts of every Lodding fixture. No obligation.*

See Us At Booth 537
A. S. T. E. SHOW

CIRCLE INFORM-A-GRAM KEY NO. 39

ORANGE 3-4301

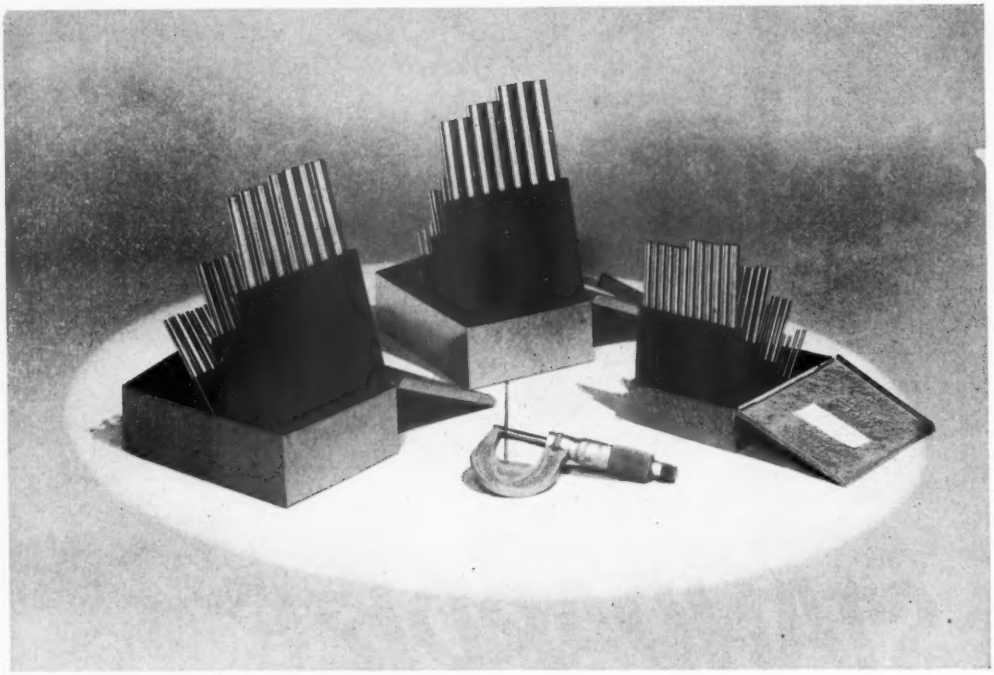
ESTABLISHED 1927

WILLIAM T. HUTCHINSON CO.

235 MAIN STREET

ORANGE, NEW JERSEY

HUTCHINSON DRILL BLANKS



115 Pieces – COMPLETE – .040" to .500" – $77.33

JOBBER SET	LETTER SET	WIRE SET
$27.12	$24.54	$25.67
in Huot Index	in Huot Index	in Huot Index

HIGH SPEED STEEL—64 "C" scale hard— gage tolerance—mirror finish.

A NOTE TO REMEMBER

We have large stocks of semi-finished material ready to be ground to meet your requirements.

CIRCLE INFORM-A-GRAM KEY NO. 40

SPIRAL

SPECIAL CUTTING TOOLS
FORM GROUND with
RADIAL RELIEF

DESIGNERS AND MANUFACTURERS OF PRECISION GROUND

Carbide and High Speed

SPECIAL CUTTING TOOLS

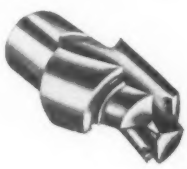
A *SPIRAL* ground cutting tool is a special tool designed to your specification on *SPIRAL'S* own special machinery. These superior tools ground with radial relief give you up to 500 per cent more tool life with precision tolerance and no decarb surface or soft spots.

Reduce your production costs with *SPIRAL SPECIAL TOOLS* that retain sharp cutting edges and produce a smooth finish on piece parts.

For engineered design, quality workmanship . . . call on *SPIRAL* to design your special tools to meet today's fast production schedules.

MILLING CUTTERS
GROUND FORM RELIEVED

TREPANNING TOOLS



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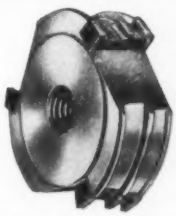

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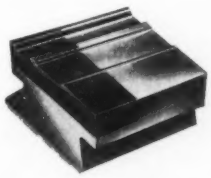

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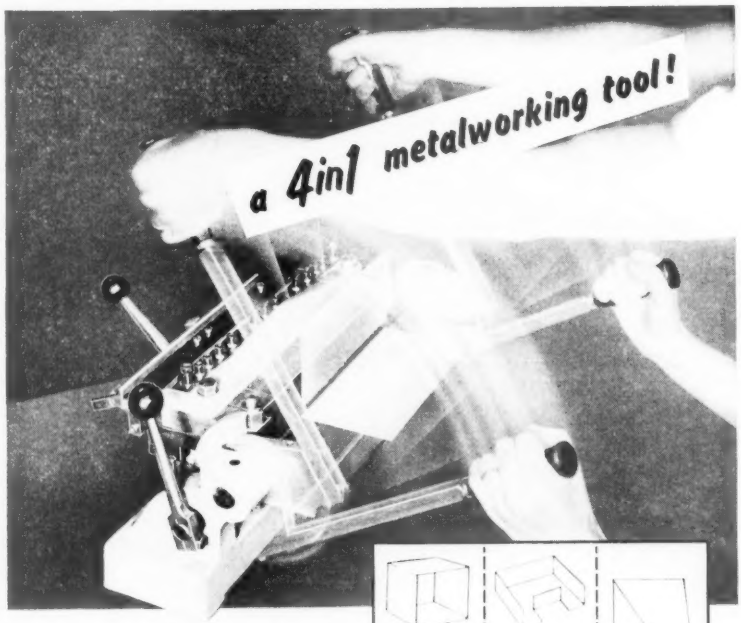

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— FEATURES —

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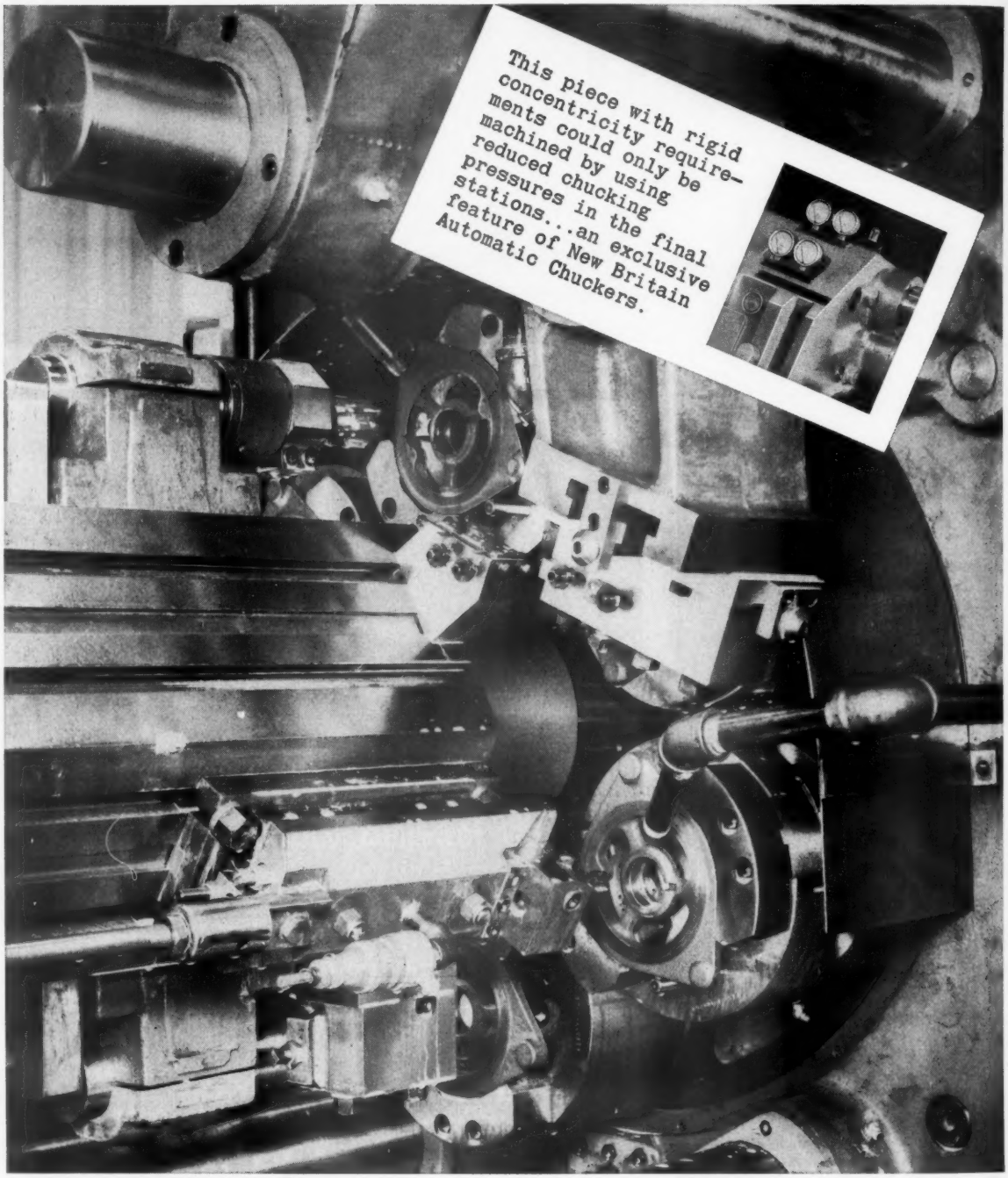
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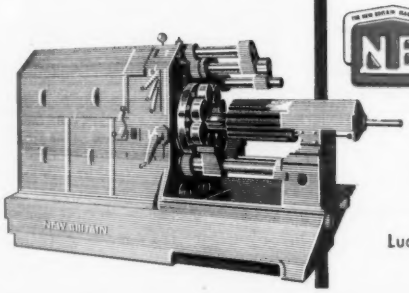

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CIRCLE INFORM-A-GRAM KEY NO. 44

Vol. XX, No. 1

The copy of TOOLING and PRODUCTION which you are reading is the kick-off to our 20th year of publication. Those of you who can remember TOOLING and PRODUCTION'S birth as a pocket sized, 12-page booklet, entitled "PROGRESS of the Special Tool, Die and Machine Shop Industry" will, we hope, share with us the inspired feeling of having participated in a truly phenomenal period of growth in the development of metal-working skills and machines.

For those of you who have more recently come into the readership circle of TOOLING and PRODUCTION, space permits only brief mention of how we came into being. When Publisher George J. Huebner launched "TOOL DIE MACHINE PROGRESS" as a private enterprise he was no stranger to the tooling industry, having served as Executive Officer, Automotive Tool & Die Manufacturers Association of Detroit, and Secretary of the Special Tool, Die and Machine Shop Industry. This was back in the "Blue Eagle" NRA days of joint government-industry Code Authorities.

By the advent of World War II, George Huebner had built the young booklet into national prominence as the TOOL & DIE JOURNAL, and had multiplied its editorial and advertising services many fold. During a portion of the war, he interrupted his guidance of TOOLING and PRODUCTION to serve as Chief, Tooling Division, Ward Production Board.

Two milestones have marked our progress in recent years. April 1951 saw our change in name from TOOL & DIE JOURNAL to TOOLING and PRODUCTION, as being more fully descriptive of our editorial premise. And in January 1953 TOOLING and PRODUCTION acquired its new look; no longer the small 6″ x 9″ page, but a full 8¼″ x 11¼″ page with greatly enhanced opportunities for generous editorial treatment and display.

Over these years TOOLING and PRODUCTION'S circulation has grown from a depression nucleus of a few hundred to the present thirty-two thousand. One yardstick of its service to readers is the volume of inquiries made by readers for more information on products mentioned in our editorial and advertising pages. We are "relaying" such inquiries at a rate of over 100,000 per year.

In this Twentieth Anniversary Issue of TOOLING and PRODUCTION we have endeavored to give you, our readers, some extra dividends.

You will find the highlights of the 1954 ASTE Industrial Exposition in Philadelphia. Particularly designed for those who will be unable to attend the convention are our many editorial pages devoted to feature articles on subjects corresponding to those to be presented lecture-wise during the week of the convention. You will find articles in such diversified categories as automation, carbide tooling, precision control, forming, and tool design. You will find these pages jam-packed with tooling and production know-how; of as pertinent interest to cost-conscious plant management as to the builder of special tooling.

As another extra dividend you will find a special tinted paper section devoted to machine tool subjects. You will read about those design features that are conducive to today's productivity demands, the latest in machine loading and unloading devices, replacement and modernization procedures, and automatic controls.

We take what we hope is justifiable pride in this 20th Anniversary Issue of TOOLING and PRODUCTION. It has been formulated and produced with your interests as the target.

By the same token, we trust that you will accept it as our pledge of a growing and continually improving TOOLING and PRODUCTION to the end that your reading time may be an increasingly profitable investment.

E. Willard Pennington

Editor

CIRCLE INFORM-A-GRAM KEY NO. 44

PIONEERS IN CARBIDE FOR METAL CUTTING TOOLS

WESSON Carbide Cutting Tools ENGINEERED FOR CARBIDE

WESSON'S UNIQUE METHOD OF CONTROL GIVES YOU THE PERFECT UNIFORMITY THAT MAKES WESSONMETAL

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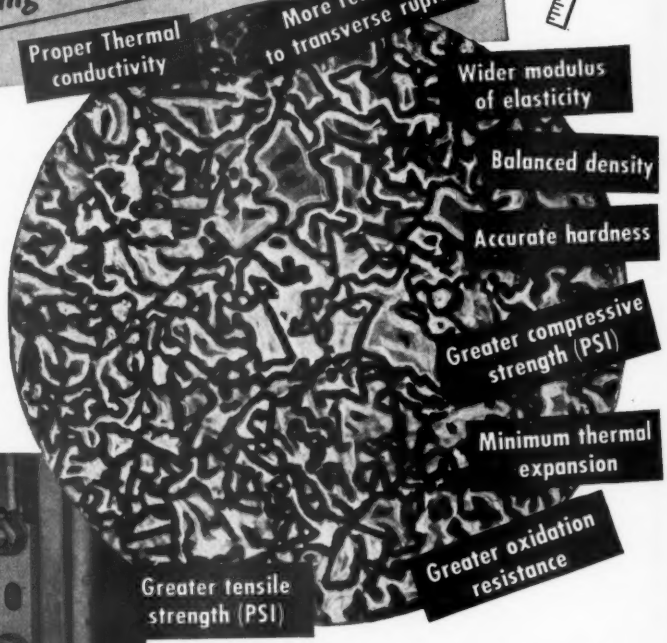
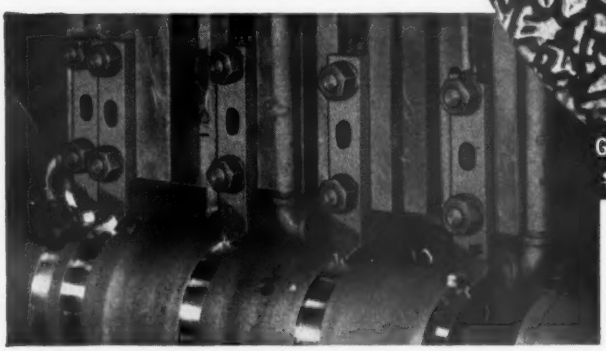
WESSONMETAL Carbide Blanks A Tip To Quality



YOUR WESSON TOOL ENGINEER HAS ACTUAL CASE HISTORIES TO PROVE THAT WESSON CONTROL ASSURES UNIFORMITY AND HIGHER PRODUCTION IN ALL TYPES OF METAL WORKING . . . ASK TO SEE THESE REMARKABLE REPORTS



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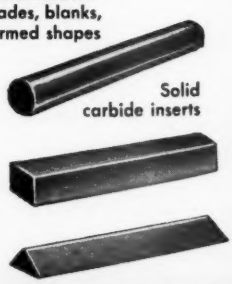

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CIRCLE INFORM-A-GRAM KEY NO. 46

by Walter P. Hill
President
WALTER P. HILL, INC.
Detroit, Mich.

NEW MACHINES AND METHODS

to Improve Output per Man-Hour

IF WE ARE to maintain our current living standard, to better it so that our economy is on a sound fiscal basis and improve it to a point where our children and those of future generations will enjoy even better living standards, we have only to improve one critical factor: output per man-hour.

The key to this greater output per worker lies entirely in the hands of the production engineers and machine designers. It is they and they alone who can put into effect the new process, the product redesigns and the production equipment that will assure greater output and solidify and improve our nation's economy.

I say that it can be done. If you have ever walked through a food processing plant, a bottling plant, a plastics or cosmetics manufacturing plant, or a lumber processing plant with extremely high speed machinery generations old, you'll know that metalworking machinery and production processes have a long, long way to go.

No doubt the reason that the metalworking machinery has been able to stay in such a relatively undeveloped state is because of the tremendous emphasis placed on assembly line techniques and materials handling throughout the years. From the day when Henry Ford

Fig. 2. DOUBLE END MACHINE. This is a special Hill machine for chamfering the OD and ID and facing the tubes to length. Tubes come to this machine already straightened and cut to length on another special machine. Here, they are loaded in a magazine from which they are fed one at a time and chucked between the magazine ends, then chamfered and faced. These operations are all performed automatically, with a production rate of 6000 tubes per hour. Tubes are then bent into a hairpin shape on a special machine.

Tube lengths for hairpin bends are fed to the machine one at a time. Once a tube is inserted in bending position over a mandrel, the machine starts an automatic bending cycle; bends are then unloaded by hand.

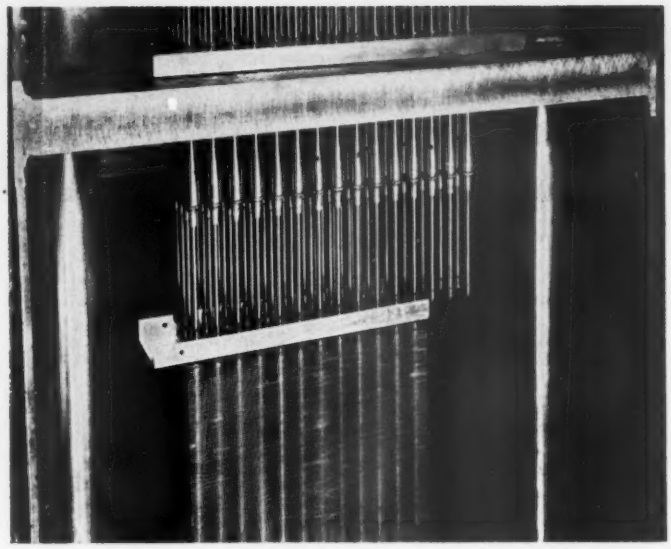


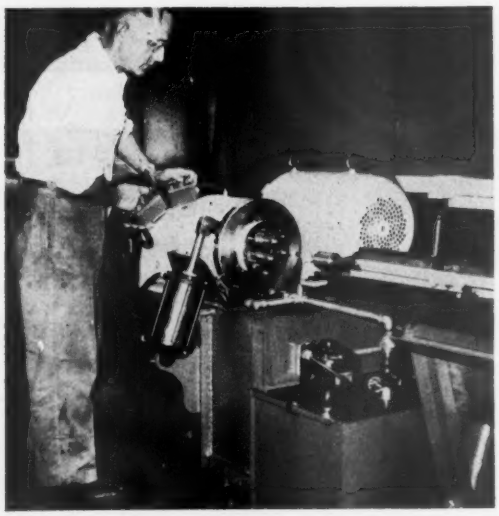
Fig. 3. TUBE EXPANDER. A method used previously in building evaporator coils has been to completely assemble them for expansion operations. Hydraulic pressure was applied to expand the tubing against the fins to provide the necessary mechanical bond. This was not too satisfactory because of failure of thin tube sections under hydrostatic pressure.

In the tube expander shown, the fins are placed over the hairpin tubes. Then this assembly is placed in the hydraulic-powered expander where mandrels enter the open ends, expand the tubes mechanically, and size tube ends. The return bends are then soldered in position, and the evaporator coil is completed. This machine will size and expand sixty, ⅜" dia. x 24" long hairpin tubes in a coil assembly in 20 seconds.

started pulling that automobile chassis past groups of assembly workers and effected such tremendous savings, it has practically been an idiom that if you had an assembly line, subassembly feeder lines and materials handling conveyors, you had reached the ultimate in cost reduction.

In the meantime every machine tool had a man in front of it; he loaded and unloaded (and still does in most cases) every part. At the end of the conveyor carrying prodigious amounts of parts was an inspector carefully gaging every part.

True, in the past several years a lot has been done to cut the labor on individual machine tools. Carbide tools have speeded up cutting cycles. Quality control systems have enabled that inspector to inspect only a portion of the batch of parts. Some operators stand in front of processing machines that do several operations. Some strides in the development of new production methods have been made in the fields of metal extrusion, metal forming, and assembly. Actually metallurgical improvements have probably done more to raise production rates in metalworking plants than any other single factor.



But we haven't even scratched the surface on what can be done. We have talked about automation of five years now; but, we haven't done much about it. We've gone right on installing the same standard machine tools, and trying to use partial automation on parts not designed for automation. You can count the truly automated plants in the metalworking industry in America on the fingers of both of your hands. And believe me, it still takes a lot of selling to convince many company managements that they can afford to invest in the new machinery and processes that can and will cut huge chunks out of product costs.

Metalworking company managements must recognize that their very salvation depends on their ability to reduce product cost through increased output per worker. Those who do not buy this idea will ultimately lose their share of the market and some will unfortunately fall by the wayside.

Fig. 4. TUBE FINNING MACHINE. This special machine will form helical fins on copper, brass, steel, and stainless steel tubing of from ½" to 1" dia. The machine feeds straight tubing through annular rolls to extrude the integral fins on the tubing. It will form from 16 to 19 fins per inch, 1/16" high at the rate of 25' to 30' per minute.

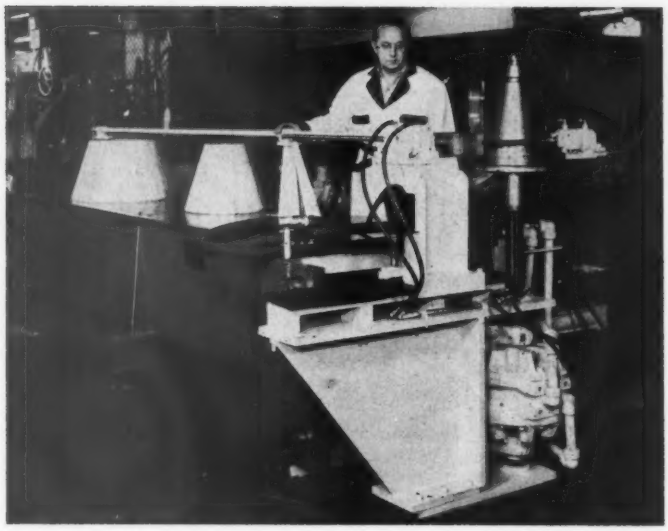


Fig. 5. **LARGE TUBE BENDER.** This machine uses the Hill bending principle, which achieves uniform bending speed through the use of high torque hydraulic motor to operate rotating die components. Nesting cone-shaped dies permit the bending of radii in infinitely variable increments from ¾" to 24". Both ferrous and non-ferrous, finned or plain tubing up to 1½" dia. and 40' long can be bent on this machine.

One very important point that I want to call to your attention is the fallacy that has gone around Industry for many years regarding the low production shop. If a plant produces only a few products a day instead of thousands of products per hour, you say: "Oh, you've got a job shop operation," and walk away leaving the plant with the idea that nothing can be done to reduce production costs. Just give him the same old equipment he's used for years and let him whittle out the parts in the same old routine manner.

Let us never forget that the job shop type of operations supply the majority of heavy equipment for Industry. And, if the output per man-hour is raised in the low production field, Industry will have to spend less money for much of its high-expense equipment. The job shop type of industry can well afford to invest in equipment and processes designed to meet its specific needs.

The design of the production machines of the future must be aimed toward the pushbutton factory. The pushbutton factory may be a long ways off for many industries, but that is the direction we must aim if the ultimate in lowering of product cost is to be achieved.

The production machines of the future will not be standard machines; to rely on standard types of machines would be to rest on antiquity. To produce parts at maximum efficiency, a machine tool must be designed for its specific operation. It can be no other way. And further, the process in which the machine tool is used may have to be altered to attain maximum productivity. This adds up to a statement of facts. The process must be the best, the machine must produce at a maximum rate and the part must be designed to fit the process.

The only limitations to the production machines of the future lie in our ability to imagine and believe. They lie also in our government tax policies that must be written to enable manufacturers who spend the money on new and improved equipment to reap their just rewards for their foresightedness.

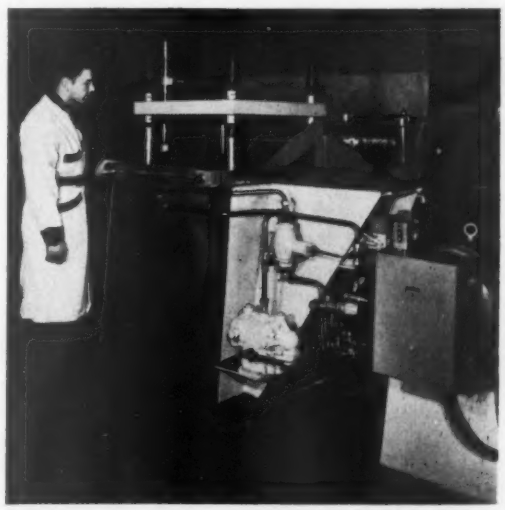


Fig. 6. **INVERTED PRESS.** This press is well adapted to bending and extrusion operations on ferrous and non-ferrous parts as well as upsetting, drawing, and coining that would require special auxiliary equipment on standard punch press equipment. Multiple operations such as piercing and deforming can be simultaneously performed during deep drawing.

With the hydraulic cylinder placed in the base, the overall height is reduced, shut height limitations are avoided, center of gravity is lower, and increased press flexibility is provided by areas available at the top and sides for mounting auxiliary hydraulic cylinders.

Fig. 7. INVERTED PRESS CLOSEUP. This is a typical operation on a Hill inverted press. Individual straight pieces of tubing are placed in the die, and dual push-button controls are actuated by the operator. The dies then close, the auxiliary cylinder or cylinders extrude the tube to the form shown, and the dies open permitting the finished part to be removed manually.

The current attitude of the government which lets manufacturers write off special machine tools in a short period should be a great stimulus to manufacturers to further exploit their stake in the period of automation that most certainly lies ahead.

One factor that is a problem in the development of new production methods and machine tools is the time required to put a facility in operation once it is built. Completely automatic machines of radical new designs require longer tryout periods than standard types that are made day in and day out to the same design. This results because of the great amount of creative effort put into machine tools engineered to produce the ultimate in production on a given job.

All too often, so-called "Rube Goldberg" designs go by the wayside because manufacturers won't sit still and be patient until the desired output rate or precision is achieved.

However, tomorrow's machine tool will be the Rube Goldberg of all Rube Goldbergs. It will be a completely integrated, extremely high speed machine, automatically passing parts from operation to operation, gaging each part at each operation, changing tools when power requirements indicate the need. It will be a mass of controls, wire and hydraulic lines. It will, however, be more compact, more foolproof, and require less maintenance than many dare to envision.

The operator will be more skilled than he is today. He's going to be better trained in mechanics and less trained in "therbligs." He won't touch a part, but the "Rube Goldberg" he runs will turn out better parts faster than any of us now dare to imagine. Tomorrow's machine must do all this if we are to maintain and expand our economy.

The accompanying pictures and captions offer an excellent example of what can be accomplished by applying new production methods and equipment to effect cost reduction.

This article has been adapted from a talk by Mr. Hill before the Eleventh Annual Machine Design Conference of The Cleveland Engineering Society.

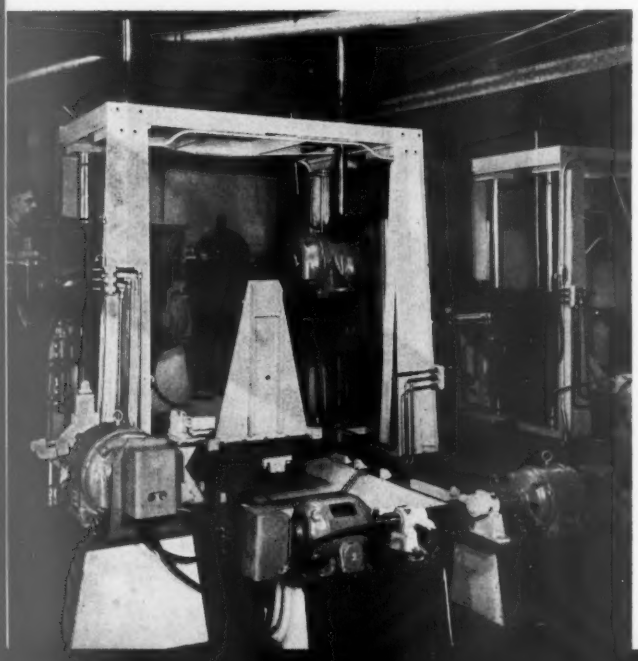


Fig. 8. OPPOSED SPINDLE DRILL. This machine drills 1,200, ¾" dia. holes on 15/16" centers in a 5' dia. x 4" thick forged steel condenser tube sheet. The fixture accommodates tube sheets from 2' to 6' dia. and up to 6" thick. Two Hill power heads mounted opposite each other are hydraulically positioned vertically to various index positions. The work is fed between the heads. Two holes with center distances that obviate the use of conventional bushing plates are drilled in the tube sheet at each horizontal table setting.

This machine produces the drilled holes in 1/10 the time required by the former layout, spotting, and radial drilling methods.

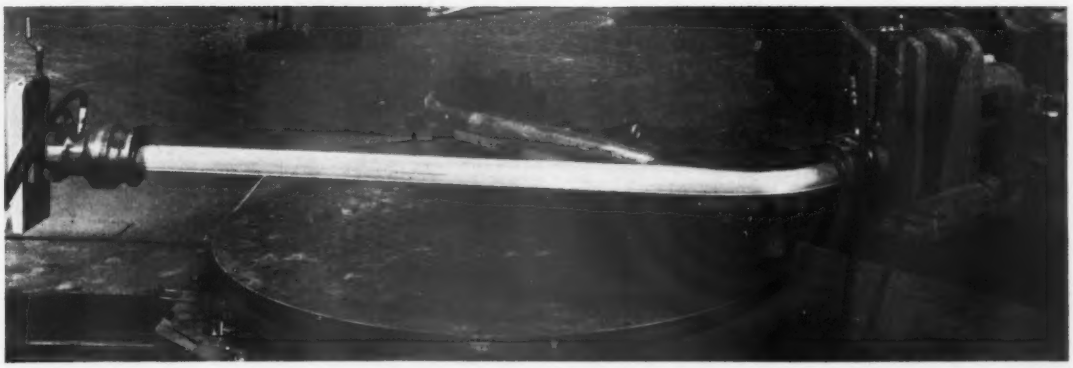


Fig. 1. This illustrates the stretch forming process. The die is bolted on the rotary table and one end of the extrusion; sheet or shape to be stretch formed is held by table mounted grippers. The opposite end of the material is held by gripper jaws on the hydraulic ram.

The Evolution of a New American Machine Tool

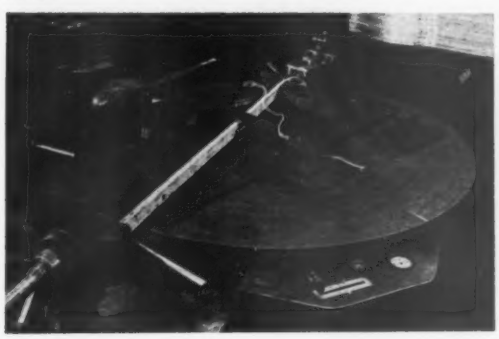
by Gordon Stephenson
THE CYRIL BATH COMPANY
Solon, Ohio

THE PROBLEM of forming metal parts to every seeming permutation and combination of contour has done no good for the air-frame contractor's ulcers. He has been presented with blueprints of shapes far beyond the capabilities of the tools available, and this has led to a hue and cry for a new metal-forming machine.

Airframe manufacturers require a great variety of formed metal parts in comparatively small numbers and, therefore, a machine to meet their needs must prove its versatility, its ability to maintain close tolerances, and its power to cope with the toughness of the new alloys.

Modern high alloy metals must be treated with respect. They are the thoroughbreds of the science of metallurgy. They respond to coaxing but not to brute force. Thus, it can be shown, that where the press brake or the con-

Fig. 2. (below) shows the first stage in forming the reverse bend, Fig. 3, (upper right) the second stage, and Fig. 4, (lower right) the final stage in forming the reverse bend.



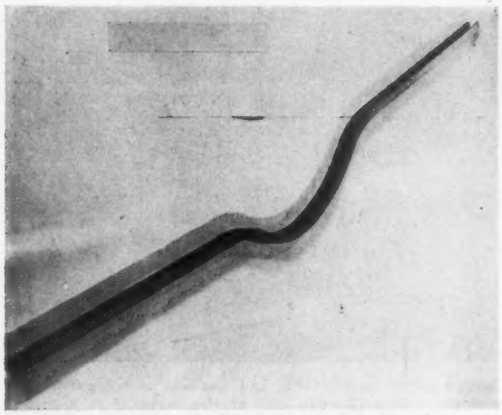


Fig. 5 illustrates the completed part produced by the operations shown in Figs. 2, 3, and 4.

ventional stretch-press method fails, a new method called "Radial Draw Forming" succeeds.

A leading west coast airplane manufacturer, after two years of fruitless effort to form tapered internal leading-edge skins of corrugated 24 AQ aluminum by using conventional stretch-press and press brake skin-stretch processes, finally installed a Bath Radial Draw Former and is now turning out all the requirements of his plant for these corrugated sheet wing members.

The Bath methods of stretch forming make use of the stretching characteristics of ductile metals. When such metals are subjected to a limited stress, an elongation, or strain, occurs which is proportionate to the stress employed. When the stress is removed the metal gradually re-attains its initial linear measurements. This stress/strain proportionality, known as the modulus of the metal, persists until a yield point is reached when the elongation per unit of increased stress becomes greater. The metal is now said to "flow", having passed its elastic limit and lost the power to regain its initial dimensions.

Should the stress be further increased, the ultimate or tensile strength of the material is reached and ruptures or fractures appear. This plastic flow is a very important behavior of metals and is the basis of most shaping operations such as stamping, spinning, rolling, extruding and forging.

In stretch-forming, the part is placed in appropriate tension and then wrapped around a die cut to the required face contour. The tension applied is calculated by multiplying the yield strength by the cross sectional area of the material, and adding roughly five per cent of the value so obtained.

The machine offers a choice of three forming methods: (1) stretch forming; (2) compression forming; and (3) radial draw or stretch compress forming.

Stretch Forming

Figure 1 illustrates the stretch forming method. The die is bolted on the rotary table and one end of the extrusion, sheet or shape to be stretch formed is held by table mounted grippers. The opposite end of the material is held by the gripper jaws on the hydraulic ram. A calculated tension is applied and this is automatically maintained while the table revolves and wraps the part being formed around the die.

The metal, while subjected to this stress, is practically flowing cold and will form to size and shape with minimum spring back. Any spring back which does occur is small because it represents the difference between the total strain and the residual strain or deformation of the metal.

Normal operating pressures do not exceed 1,500 lbs. per sq. inch and with the smaller machines, 1,000 lbs. per sq. inch as shown by the scale readings on the hydraulic ram.

Reversing Bend Procedure

Figures 2, 3, and 4, illustrate the use of the Bath Contour Former in the production of reverse bends. These can be produced in extrusions or rolled sections by a combination of the reversible motion of the table with supplementary dies. The illustrations demonstrate a typical example of continuous reverse bending — a semi-circle necessitating two reversals in an extruded part. Two supplementary dies are required for the complete operation. The first position of the bend from the initial straight to the semi circle is formed round a fixed die mounted on the table in the usual way. The

Fig. 6 shows the compression forming method used when the metal may not withstand the reverse bend method.

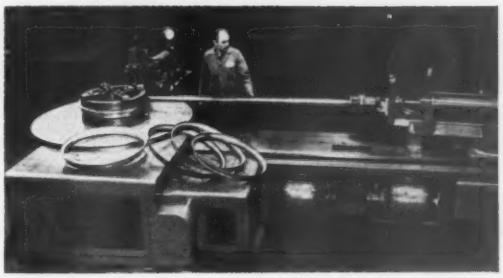


Fig. 7 illustrates the draw forming process. The side-head pressure shoe is seen to be at the right of the operator.

second die is swung into place, locked, and the semi-circle formed by a reversal of the table's rotation. The use of the third die and another reversal of the table's rotation complete the formation of the part shown in Figure 5.

Compression Forming

In the forming of sharp bends, it may occur that the elongation of the outer fibers of the material by the basic stretch process is more than the characteristics of the particular metal specified for the part can withstand without resultant orange-peeling or fracturing. In such cases, the compression forming method shown in Figure 6 is adopted. This provides for the forming of the contour with greatly lowered percentage elongation and the finished part can fulfill its duly appointed duties with its innate physical properties fully retained and without evidence of slip lines as in a metal stretch-strained to its tensile limit. It is one of the advantages of the Bath method that a complete choice is offered between the compression and stretch techniques.

In compression forming, the carriage on which the hydraulically actuated ram is mounted is locked in a suitable position on its slide in order to withstand the side-thrust set up by the compression action as the die table rotates and direction of pressure of the main ram cylinder is reversed.

Fig. 8. A close up view of the action of the side head pressure shoe in the formation of semi-circular jet combustion chamber rear linings.

Radial Draw Forming

Radial draw forming makes use simultaneously of both the stretch and compression methods. An additional hydraulic sidehead is mounted adjacent to the rotary table and is used for the compression part of the operation. The material is held in tension between the main hydraulic ram and the table, which, in revolving, draws the forming part over the die. Simultaneously, pressure, to ensure close contact between the metal and the forming die, is supplied radially from the side-head. The side head functions like a pressure pad and "irons" the part onto the die, so ensuring consistancy of cross section in the formed part. To achieve this, the face contour of the side-head pressure shoe must be an accurate inversion of that of the part being formed.

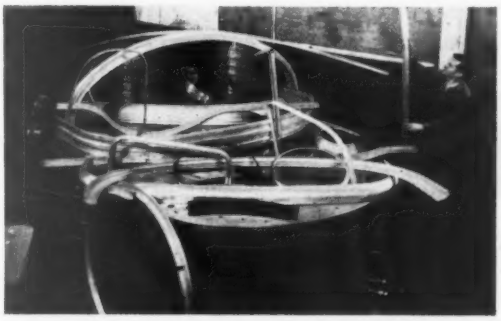


Fig. 9 gives some idea of the variety of parts which can be formed on Bath machines.

Radial draw forming is particularly applicable to making true rings or closed rectangular shapes, and Figure 7 shows the formation of jet combustion outerliner rings.

Figure 8 gives a close-up view of the action of the side-head pressure shoe in the formation of semi-circular jet combustion chamber rear linings. Figure 9 gives some idea of the variety of parts which can be formed on Bath machines.

The Precision Stretch Former

The development of Bath stretch forming and the addition of the right angle wipe shoe to facilitate the Radial Draw forming process, has now led to the evolution of a new machine known as the Precision Stretch Former as il-

. . . Continued on page 194

Regenerative Gas Turbine . . .

ANOTHER MILESTONE IN AUTOMOTIVE PROGRESS

THE SCENE above is a bit sensational on two counts.

First, the test runs of the Plymouth sport coupe at the Chrysler Engineering Proving Grounds were the latest stage in more than nine years' work on gas turbines by Chrysler Corporation engineers.

Second, the car's license plate GT-1001 symbolizes the fact that this is the first production model passenger car powered by a gas turbine engine.

James C. Zeder, Chrysler Corporation Vice President and Director of Engineering and Research, who announced the development of the new turbine, termed it "a milestone in motive power engineering."

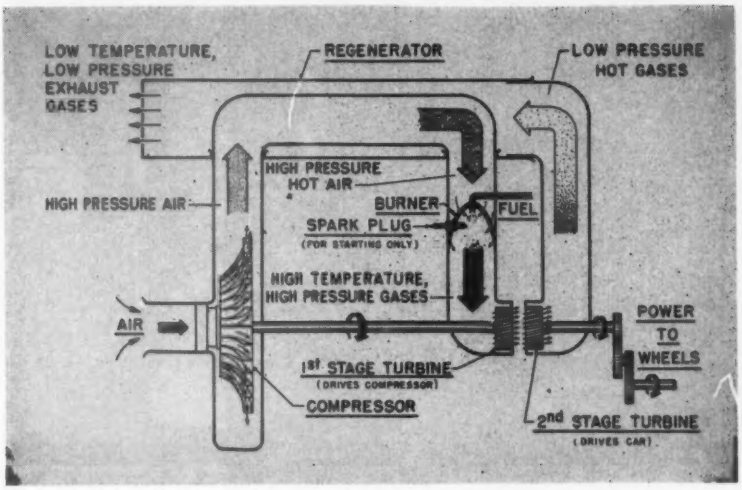
"Solution of the fuel consumption and exhaust heat problems, which have been two of the chief drawbacks in automotive gas turbines," Mr. Zeder declared, "removes a barrier that has challenged engineers for decades, and indicates eventual power plant efficiencies of great scope."

Key to the Chrysler-designed turbine engine's remarkable fuel economy and cool exhaust is a revolutionary new heat exchanger or regenerator, which utilizes most of the heat discharged as waste by conventional gas turbines.

Chrysler Corporation engineers deliberately designed the test turbine and its compact regenerator unit on the scale of the Plymouth engine compartment. The turbine engine is now operating in a 1954 Plymouth Belvedere sport coupe.

George J. Huebner, Jr., Executive Engineer in charge of research, directed the development, design and laboratory test work on the Chrysler gas turbine.

This scene symbolizes the official extermination of one of the bugs that has long stymied the development of a gas turbine for automobiles. Chrysler Corporation President, L. L. Colbert demonstrates that with the turbine engine running the temperature zone a few inches from the tail pipe is cooler than that from a piston engine. What has become of the extremely high temperatures always associated with turbine exhaust? The ingenious regenerator portion of the Chrysler turbine converts heat from the exhaust gases to additional power for the car, and offers a fuel economy equal to that of present-day car engines.



Schematic diagram of Chrysler Corporation gas turbine. Note that its one spark plug is used only when starting, in order to fire the fuel. After powering the first and second stage turbines, the still hot gas enters the regenerator and gives up its heat to the incoming, highly compressed air.

The Chrysler gas turbine is almost 200 pounds lighter, and has less than a fifth as many major moving parts as a piston engine of similar power, Mr. Huebner said.

Unlike the automotive piston-type engine, the gas turbine delivers its highest torque during breakaway from a stationary position. Moreover, the torque available for acceleration from any given speed within the range of the turbine-powered car is much greater than that produced by piston engines and transmissions.

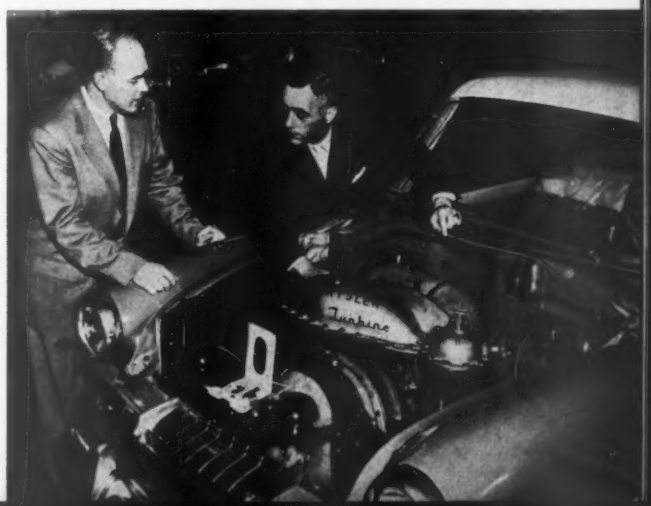
"The Chrysler turbine engine is rated at 120 shaft-horsepower," Mr. Huebner said, "but because of its torque characteristics, it delivers essentially the same performance at the rear wheels as a 160-horsepower piston engine with transmission. It is relatively simple to design much more horsepower into the turbine engine whenever it is desired. The real challenge was to design a unit in the horsepower ranges common to most cars used in everyday driving."

The turbine is inherently vibration-free, because combustion is continuous, and because its few moving parts rotate smoothly on ball or roller bearings.

Since the gas turbine is air-cooled, it requires no radiator or liquid cooling system. The closest thing to a radiator on the Chrysler turbine engine is a small, finned cooling tube for the lubricating oil. This is mounted in the intake air passage.

The gas turbine's electrical system consists of a storage battery, starter-generator, coil, breaker, and a single spark plug — which is needed only in starting.

"In a piston engine," Mr. Huebner pointed out, "temperatures of exhaust gas leaving the manifold are about 1,000 degrees F. when idling and 1,400 degrees during full-throttle acceleration. Comparable temperatures of exhaust gas leaving the regenerator of the Chrysler gas turbine are many hundreds of degrees lower. In both types of engines the exhaust gas temperature continues to drop as it travels toward the tail pipe. Since the exhaust leaving the 10-inch-wide elliptical tail pipe of the turbine-powered Plymouth is much cooler than that discharged by a conventional piston engine, the hazards previously associated with turbine exhaust are eliminated."



The Chrysler turbine fits neatly within the confines of the Plymouth engine compartment. The power unit, which is almost 200 pounds lighter than a piston engine of comparable power, is only 32 inches long, 33 inches wide and 28 inches high. Project Engineer William I. Chapman (left) and George J. Huebner, Jr., Executive Engineer in charge of research for the Chrysler Corporation Engineering Division, check the installation of the turbine's controls. Mr. Huebner directed the development, design and laboratory test work on the Chrysler gas turbine. "So far as we know," Mr. Huebner said, "this is the first time an automobile gas turbine has been designed which combines outstanding performance characteristics with fuel economy comparable to that of today's piston engines."

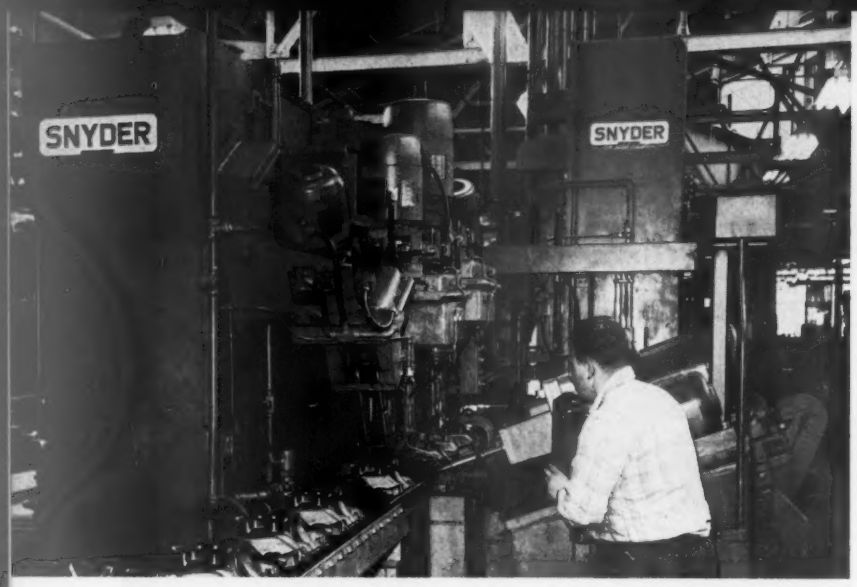


Fig. 1. This 22-station transfer machine, used in the modern DeSoto V-8 engine plant at Detroit, performs all drilling, tapping, and other machining operations on intake manifolds except the broaching of two large joint faces. Manifolds travel through the entire transfer machine system in approximately 20 minutes, the operations being performed far more rapidly than would be possible if individual drilling and tapping machines were used.

Photo, courtesy of Chrysler Corp.

THIS IS TRANSFER . . .

THE BACKBONE of the typical automated production line in today's automotive plant, and in many other plants as well, is the in-line transfer type machine tool. This type machine is especially suited to the mass production of product parts that need not be revolved and can be progressed through a sequence of machining operations.

The typical transfer machine is characterized by successive pairs of opposed machine heads . . . each driven independently . . . but all interlocked as integral parts of one long machine by a common conveyor or transfer mechanism which moves or indexes parts automatically from station-to-station. Machining heads are often mounted on a common base with a common chip disposal system. Transfer and machine cycles are synchronized and controlled automatically from a single control panel.

The transfer of work from station to station can be accomplished in a number of ways. A major consideration is the shape and weight of the workpiece itself. Some product parts require fingers to clamp on and pick them up for advance. Others are best handled by a carrier into which the workpiece nests and which is progressed with the workpiece. The simplest method that will permit accurate indexing and positioning of the workpiece, is usually the best method.

An accepted method of work transfer, and related machine design, is described here. The description is TOOLING and PRODUCTION's interpretation of good practices incorporated

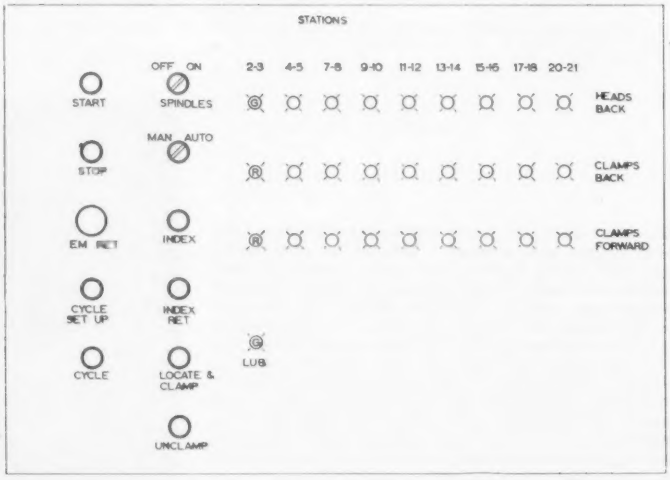


Fig. 2. The main control or operating panel for a typical transfer machine of the type shown in Figure 1. In the left-hand section are the pushbuttons and selector switches for manual or automatic operation of the various functions. Indicating lights show when the machining heads and clamps are in their proper position. These lights also help the operator to locate any trouble, since the failure of any machining head or clamps to return to proper position will keep all of the succeeding lights out.

in Snyder machine tools, as revealed by numerous drawings examined through the courtesy of Leo Gajda, Director of Engineering at Snyder Tool & Engineering Company.

Work Indexed by Shuttle Bar

Running the full length of the machine are two rails on which the workpieces slide when transferring from one machining station to another. See Figure 3. These rails rest on, and are integral with, the individual-station work fixtures. These rails are so positioned that their upper bearing surfaces form an open "V" for proper nesting of the workpiece.

Also running the length of the machine is a transfer bar, Figure 4. This bar shuttles back and forth, moving each workpiece along the rails from station to station. A double-acting hydraulic cylinder, whose operation is controlled by solenoid-operated four-way valves, gives a reciprocating motion to the transfer bar.

On the forward stroke of the bar, pawls attached to the bar are in their normal elevated position and engage the various workpieces advancing each to the next station. On the return stroke of the bar, the pawls are free to rock on their pivot pins and pass under the workpieces without engaging them. Pins are provided to limit the rocking motion of the pawl in each direction.

In a typical machine, where the actual increment of work travel is 24", the indexing cylinder will have a stroke of 25". Thus, the bar is in motion when the pawls contact the workpieces. Since each workpiece "floats" on the transfer rails and is accurately located by the station fixture, slight variations in cylinder stroke will present no problem.

On a transfer bar having an over-all length as great as 491", sectional construction is employed. Pawls are staggered from side to side along the bar, in order to balance the work load and prevent bar distortion.

Work Fixtures Operated Hydraulically

A typical Snyder work fixture is shown schematically in Figure 7, in working position. A hydraulic cylinder, by means of cams and linkage, operates locating pins and clamps which properly position and solidly hold the work while the actual machining is being done

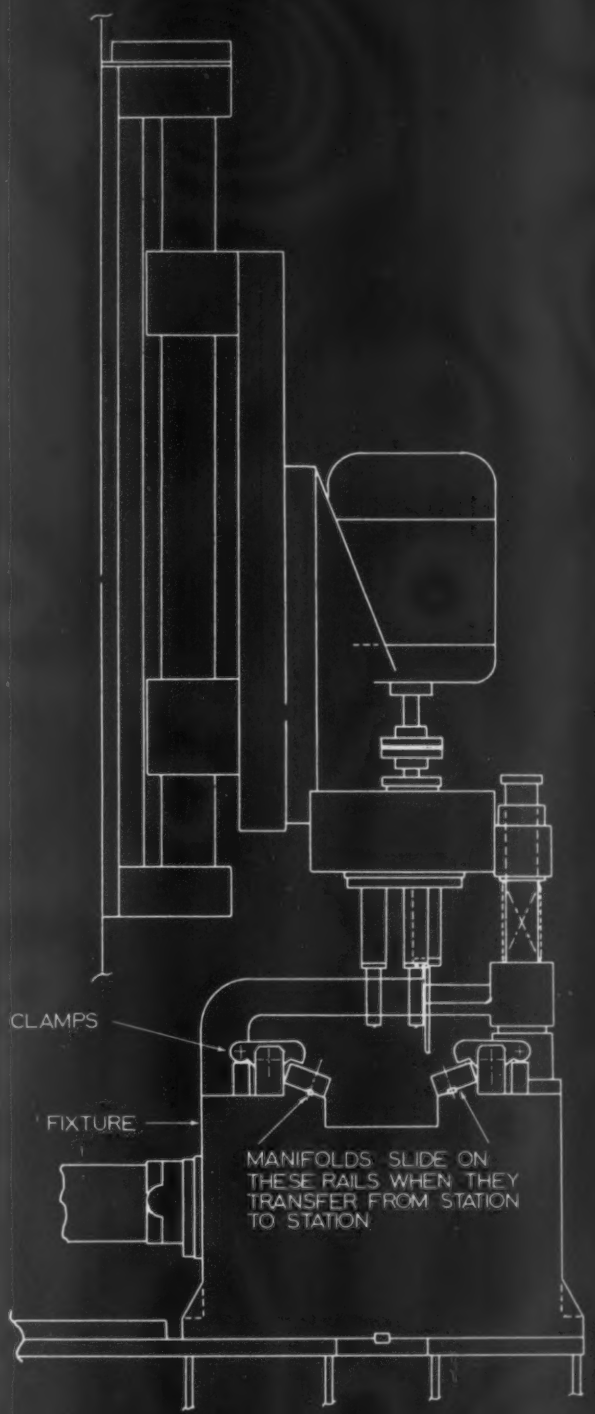


Fig. 3. Schematic cross-section taken at a typical machining station. Note the method of guiding tools so performance will not be influenced by any minor deflection of the machining head.

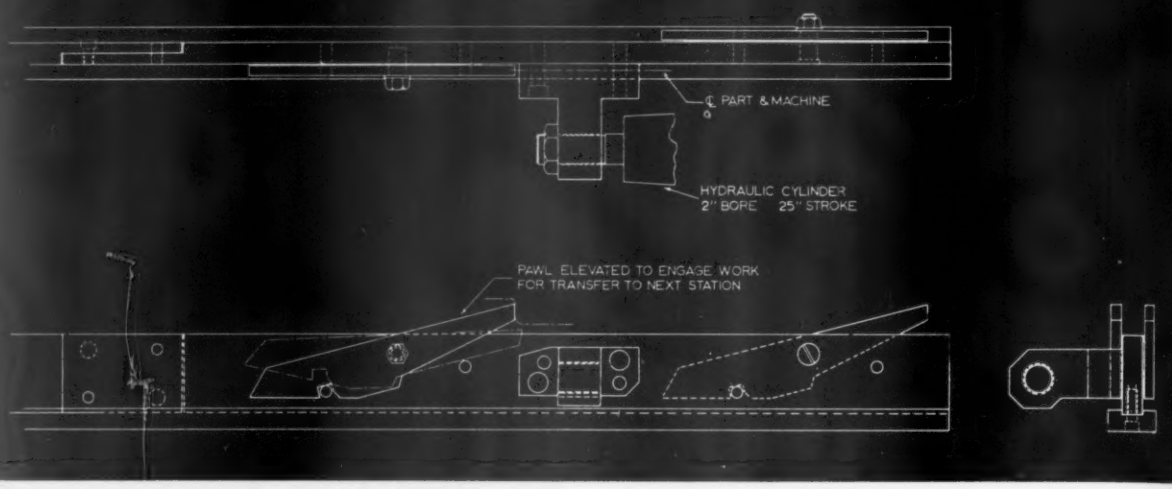


Fig. 4. Hydraulic-operated transfer bar with pawls.

Study of the illustration will show that, as the cylinder strokes, the centrally located block-type cam follower is elevated. In doing so, the follower lifts the entire linkage system supported on a lower spider arrangement. It will be noted that the universal locating pins function first, rising from below the transfer rails to enter into holes in the workpiece for positive location of it. The clamps then come into action to solidly hold the workpiece.

Interlocking Provisions

For work to be transferred from one station to another, all machining heads must be back —in non-working position. Each head trips its own limit switch; and, since all of these limit switches are wired in series, failure of any one head to retract will prevent further operation of the machine.

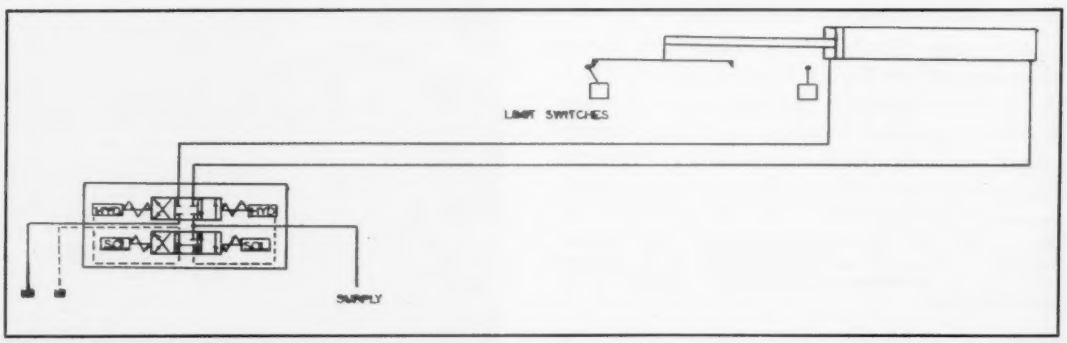
With all of the heads back, an electrical interlock circuit will be closed—energizing, at each station, a four-way solenoid valve which operates the hydraulic cylinder on the work fixture, unclamping the workpiece, and withdrawing the locating pins. The work-fixture cylinders also trip limit switches which, when all stations are unclamped, will permit the operation of the indexing hydraulic cylinder—transferring each workpiece to the next machining station.

At the end of the indexing stroke, another limit switch is tripped — energizing the solenoid-controlled valves operating the work-fixture cylinders that locate and clamp the workpieces in position. When all stations are properly clamped, the machining heads can move forward and the indexing cylinder can return the transfer bar to its original position in preparation for the next cycle.

All of the sequences for automatic operation are controlled by electrically interlocking relays, which are operated by the various limit switches already mentioned. These limit switches are located at the extremities of travel of the various machining heads and fixture hydraulic cylinders, thus assuring full travel of all devices.

This machine may be operated either automatically, as described above, or each operation may be performed manually from the main

Fig. 5. Hydraulic circuit for control of indexing cylinder.



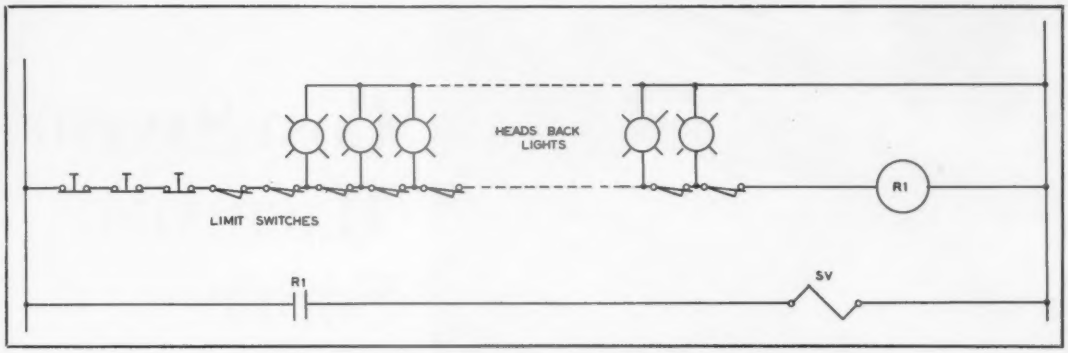


Fig. 6. Electrical schematic of portion of interlock circuit.

control panel (Fig. 2). Remote pushbutton stations are located at strategic locations on the machine for additional flexibility of manual control, and in emergencies.

Circuit Fixtures

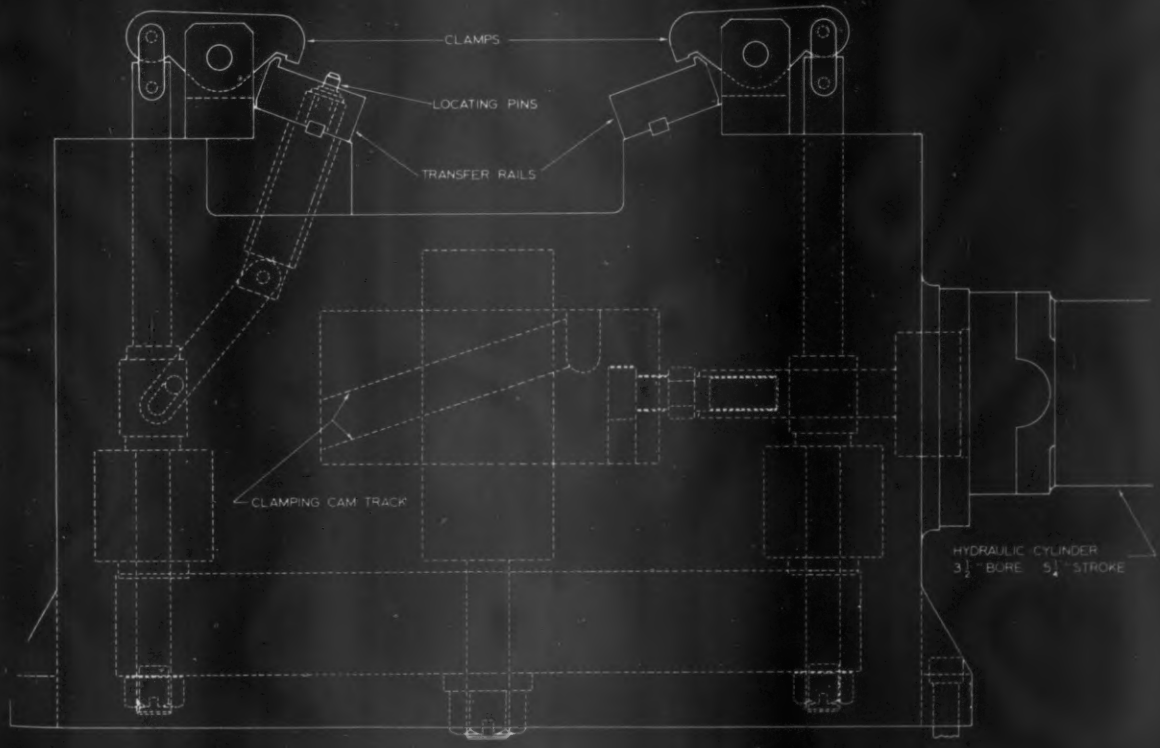
Figure 5 shows the hydraulic circuit for the indexing cylinder. The direction of the cylinder movement is controlled by electrically-operated solenoid valves, one for each direction of cylinder travel.

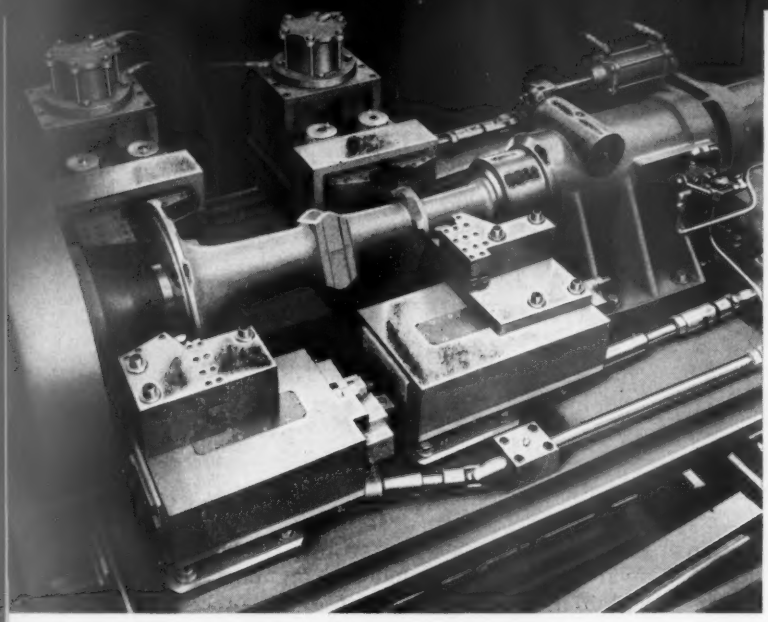
With the right-hand solenoid energized, supply pressure will be admitted to the left-hand hydraulic cylinder operating the four-way valve—moving the indexing cylinder to the position shown. Operation of the other solenoid valve will cause an opposite motion. The limit switches, which are set so as to trip only at the extremities of the cylinder travel, are tied in with the electrical interlock system and will tie in or lock out the electrical controls for the operation of other machine components.

Figure 6 shows a simplified electrical schematic of a portion of the interlock circuit. With all machining heads back, the limit

. . . *Continued on page 187*

Fig. 7. Hydraulic-operated work fixture.





Cost-Saving Machining Set-up

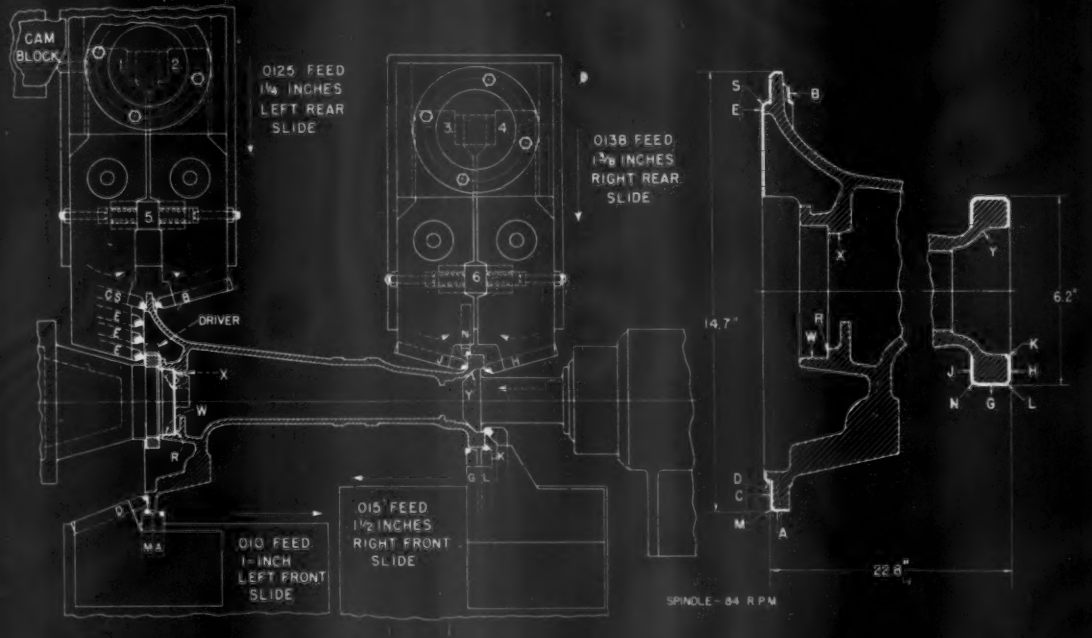
MANY OF TODAY'S machine tools are designed for ease and simplicity in tooling for intricate multi-cut operations. Here is a Gisholt Simplimatic Automatic Lathe set up to simultaneously machine both end flanges on tractor rear axle housings in a single, fast operation. All turning and some chamfering is done by the two front slides. The two rear slides take care of the straddle facing, doing it in an unusual manner. Each of these rear slides consists of a pair of pivoted tool blocks which have a scissors-like action.

The two right rear tool blocks are tightly wedged together at the start of the cut. When straddle facing is completed they spring apart, providing tool relief for withdrawal.

The two left rear tool blocks have a different action. Here, the tool blocks are partially wedged together as the slide feeds the tools into the work. As the slide continues to feed forward, the straddle facing tools are brought closer together. This splits the wide facing cut among three tools. At the completion of the cut, the tools spring apart providing automatic tool relief.

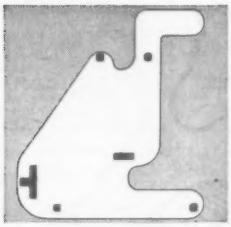
Floor-to-floor time for the entire automatic operation is 1.33 minutes. Carbide cutting tools are used throughout.

A set-up of this type permits greater production, saves handling time, and permits better control of accuracy. ◆ ◆ ◆

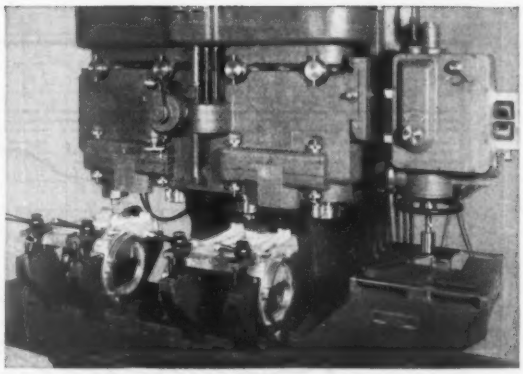


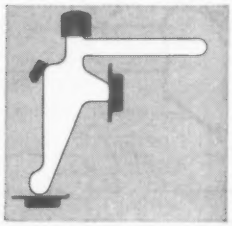
CINCINNATI

An Easy and Economical Way *to mill isolated flat surfaces*

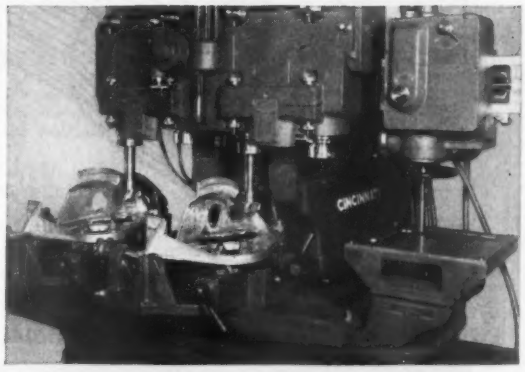


Milled by the automatic profile control method—six pads on aluminum saddle brackets. Approximate production 28 per hour.

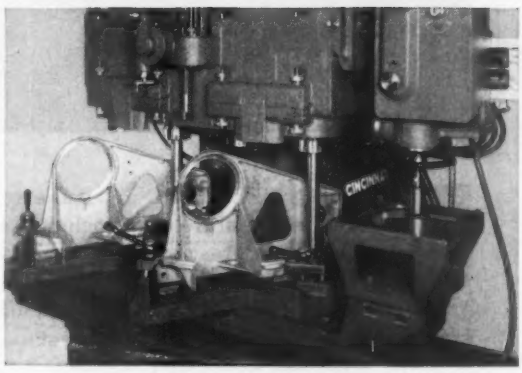




Milled by the automatic profile control method—four pads on aluminum saddle supports. Approximate production 22 per hour.

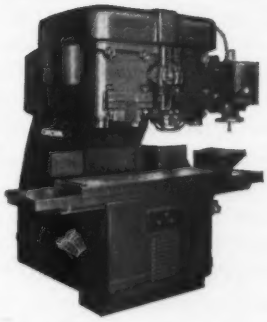


Milled by the automatic profile control method—four pads on these odd shaped aluminum parts. Approximate production 34 per hour.



Here's a new twist that may save you time and money in machining isolated bosses or pads. When a number of machined "islands" are in the same plane, mill them by the automatic profile method. In effect, you're not profile milling, but the automatic profile control unit guides the cutters over each pad in the shortest possible distance. ¶CINCINNATI Four Spindle 360° Automatic Profile Milling Machines offer you the most productive and lowest cost possibilities for work of this type. Three examples are illustrated here. The drawings indicate the path taken by the cutters, and the color spots represent the pads milled. Templates can readily be made from ordinary sheet metal. Brief data about these cost-reducing Automatic Profile Millers will be found in Sweet's Machine Tool Catalog. Complete data in catalog No. M-1215-3.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI Four Spindle 360° Automatic Profiling Machine. Catalog No. M-1215-3 contains complete specifications.

CINCINNATI

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

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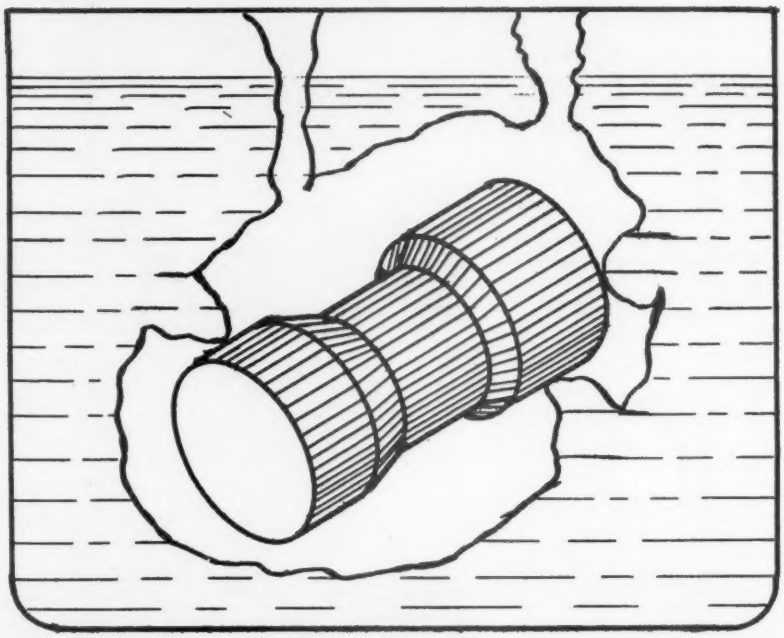

by Frank M. Aldridge
President
General Manager
ALDRIDGE
INDUSTRIAL OILS, INC.
Cleveland, Ohio

Fig. 1. The white area around the steel work piece represents the vapor blanket formed as the steel is plunged into the quenching bath. This vapor formation is slowly dissipated as the quenching solution starts to boil.

MUCH HAS BEEN SAID about the speed and the temperature of quenching mediums having a great effect on the distortion and cracking in steels. Our conclusions from many experiments and observations of production quenching are quite different.

While there are many factors to be considered, we find that vapors formed in the quenching bath frequently create a much greater strain in the steel pieces, thus causing distortion and cracking, rather than either the speed or temperature of the quenching bath.

By speed we mean the faster rate of extracting the heat from the work piece. The more rapidly the temperature is reduced from the critical to below the nose of the isothermal curve (Figure 3) the greater and deeper is the resulting hardness. Since water hardens steels better than oils and other materials and since distortion and cracking is a greater hazard when using water for quenching, many have drawn the conclusion that the distortion is caused by the rapid quench.

Many feel that the sudden temperature drop of the steel from 1500° or 1600° is the major cause of the internal strains and cracking. On certain steels this may contribute, but our observations are that the fast heat extraction from the steel is most important in making steels hard and getting deeper hardness but it does not have nearly as much to do with warpage and cracking as the formation of vapor in the quenching fluid.

The vapor, or initial phase has long been recognized as the slowest period of the quench because the vapor which forms around the metal acts as a blanket which retards the heat transfer. (Figure 1, shows schematically how the vapor formation blankets the steel piece as it is plunged into the quenching bath.) During the vapor phase the heat is extracted unevenly from the work piece. Neither oil nor water can have uniform contact at all points of the steel because of the vapor. One man terms this period as a "vibration" of a quenching oil or water. This results in uneven quenching throughout the work piece, thus causing the internal strains that result in warpage.

Straight mineral oils which are most commonly used for quenching purposes have a prolonged vapor phase. They do not bring out the full hardness of the steel. Yet they frequently cause considerable warpage and distortion in the work. Very often the pieces have uneven hardness and this indicates the uneven heat extraction due to the vapor phase.

During the first five seconds that the work is immersed in the oil, the vapor pushes the oil away from the piece intermittently, as shown in Figure 1. With good agitation when using a straight mineral oil the hardness will improve somewhat. But the vapor phase still exists and distortion results.

We have found a way in which oil can be compounded that materially increases the hardness and depth of hardness, and at the same time reduce distortion, warpage, internal stresses and cracking. Operating at the same temperatures as regular mineral oils, using the same steels, furnaces, quenching tanks and agitation, experience has shown that our compounding technique accomplishes these results.

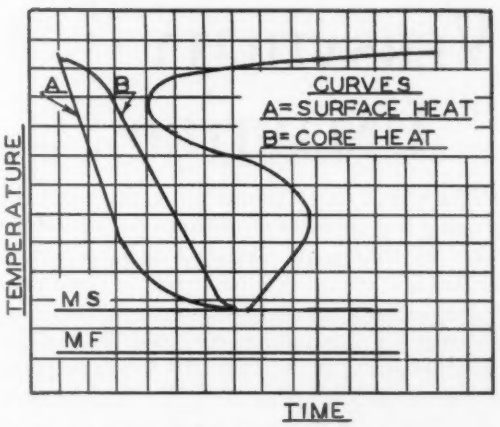

Fig. 3. This Isothermal Transformation Diagram shows the surface heat and core heat curves of the steel coming into balance at approximately the time of entering the martensite range. This is due to the higher temperature of the marquenching bath.

Quenching oils compounded with Quenzine Concentrates give steels from 5 to 15 Rockwell "C" greater hardness, yet reduces distortion from 25% to 100%. These oils reduce the vapor phase and get into the boiling phase, Figure 2, where the heat is extracted the most rapidly. This gives uniform heat extractions as the oil is kept in closer contact with the steel. Much greater uniformity in the hardness throughout the work piece reduces the internal strains so that the cracking and distortion is minimized.

. . . Continued on page 191

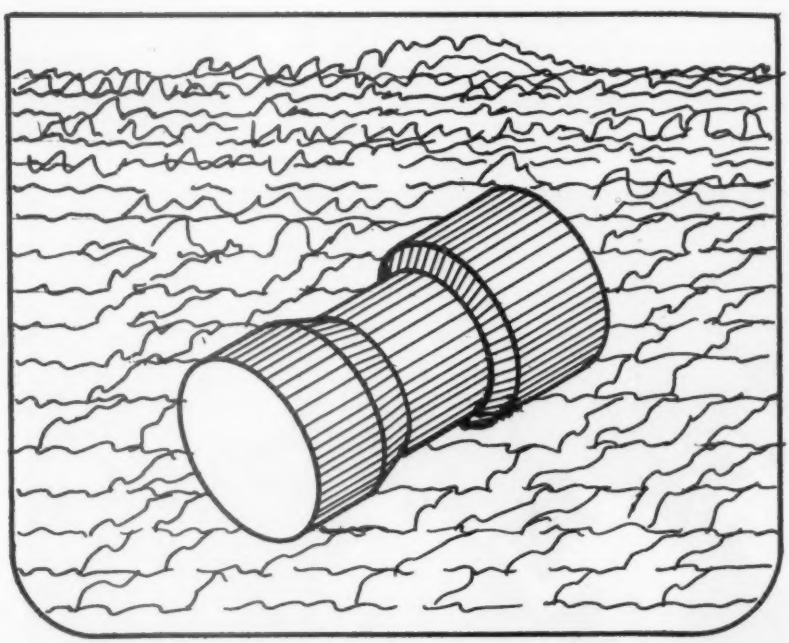

Fig. 2. As the vapor is dissipated, and the heat continues to transfer from the steel piece to the quenching oil, boiling action starts. However, the vapor phase is reduced with quenching oils compounded with Quenzine Concentrates and boiling starts sooner due to more rapid heat extraction.

VERSATILITY UNLIMITED . . .

VERSATILE CONTROLS and loading and unloading features are plentiful in such machine tools as Cincinnati Shaper Company's press brakes and shears as is indicated by these photographs. Figure 1 shows a rapid removal scheme as applied to a press brake used in the manufacturing of O. G. gutter. Automatic feed of coiled stock, automatic cutoff cycle, forming and ejection of the part are all tied in systematically with the stroke of the press. Approximately two miles of this O. G. gutter are produced per hour, a considerable saving in both time and quality of production over the usual rolling machine operation.

Figure 2 shows a new trend in machine tools in that it is sometimes cheaper to move the machine itself than it is to move the material being used. This particular shear is fed coiled stock which in turn is cut into keystone blanks. This shear is mounted on a turntable that is rotated by means of a circular rack and pinion. The shear can be set at different positions to eliminate excess handling of the stock. It can be turned 90° either side of center.

A progressive setup on a press brake, where work is transferred by hand from one station to another and four operations are performed to produce a television chassis, is shown in Figure 3. This operation is interesting in itself in that there are almost 300 holes put into the blank and in the final steps, the blank is formed up to produce a final product. The bends are made in the last two press stations.

Photos courtesy of the Cincinnati Shaper Co.

Fig. 1. Two miles of gutter per hour

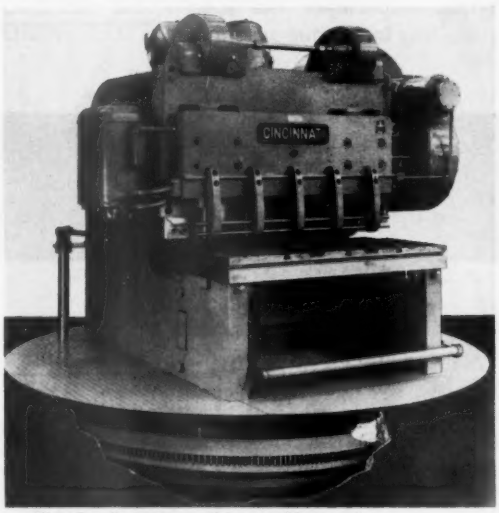

Fig. 2. A new trend in machine tools

Fig. 3. A progressive setup on this press brake shows the work being transferred by hand from one station to another to produce a television chassis.

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CIRCLE INFORM-A-GRAM KEY NO. 65

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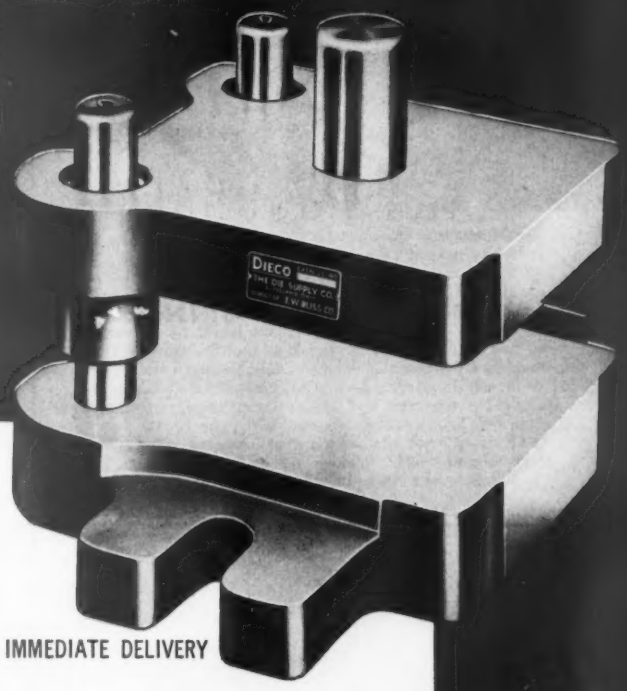

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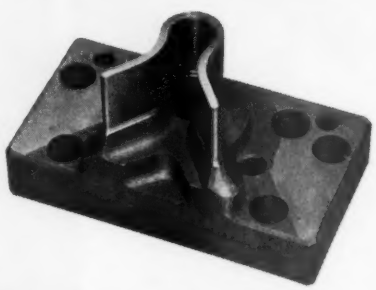
Before hardening, this two-station die block was Moore-Jig-Bored to eliminate the need for excessive grinding. After hardening and surface grinding, all holes were Moore-Jig-Ground to exact size and location. Blank hole and center piercing hole were ground with ½° included taper. Little clearance could be allowed between punch and die. Jig grinding time: *only 2¾ hours.*



CONTOURS, Too, Accurately Jig Ground and Checked in One Setting

This flanged punch, impractical to grind by any other method, was a natural for the No. 2 Moore Jig Grinder. All radii—male and female—were ground accurately to location and size. The piece, having been set up on a rotary table, was aligned to permit grinding of the angular surfaces. And the entire contour was inspected by the "indicator measuring" method while the punch was still on the machine.

The word "versatile" must have been coined for the No. 2 Moore Jig Grinder. Not only does this machine relocate and grind straight and tapered holes with ease, but it contour grinds, chop grinds and slot grinds just as skillfully.

The Moore Jig Grinder, together with its toolroom teammate, the Moore Jig Borer, enables tool and die sections to be produced concurrently, puts diemaking on an interchangeable-parts-and-assembly basis. And it's also a time-saver on production jobs.

Employing the accurate lead screw measuring principle and a convenient system of coordinate hole location, the fast and sure Moore Jig Grinder eliminates hours of checking on bench and surface plate.

Why not find out how this remarkable machine can save *you* sizeable chunks of time and money. Write today for our detailed bulletin.

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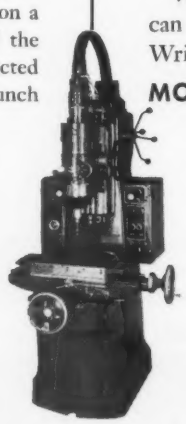

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CIRCLE INFORM-A-GRAM KEY NO. 68

GUARDING AGAINST OBSOLESCENCE

by George L. Kluter
Works Engineer
THE WARNER & SWASEY COMPANY
Cleveland, Ohio

In addition to turning out parts for an aircraft manufacturer, this battery of modern ram type turret lathes is doing a job of guarding against obsolescence. In contrast to the 1928 ancestor shown below, these modern No. 4's, of 2" bar capacity, are equipped with powerful 12-speed heads. With 2-speed motor, 24 speeds, from 30 to 1532 rpm, are quickly obtained by single lever preselection. Motor horsepower has been increased to 15 to take fullest advantage of the latest metallurgical advances in tools and materials. Today's turret lathes have the specifically designed strength and rigidity essential to accuracy and long life. They are complemented by power-assisted holding devices for quick, easy and safe chucking of workpieces.

IT IS MY JOB to help keep my company modern and competitive. That is why I look at obsolescence as I would a disease.

If you don't watch out for the symptoms, you may get so bad a dose of it that you can't recover. But if you are on your toes, if you flag the signs far enough ahead, you can take the necessary preventive measures.

It's a matter of flagging the signs. How is this done? Well, I'll tell you how we do it at The Warner & Swasey Company. We put up warning flags as follows:

Flag No. 1

This flag comes up from the Standards Department. They list any machines that are too worn to hold required tolerances, or too antiquated in design to turn out work as required by estimated production standards.

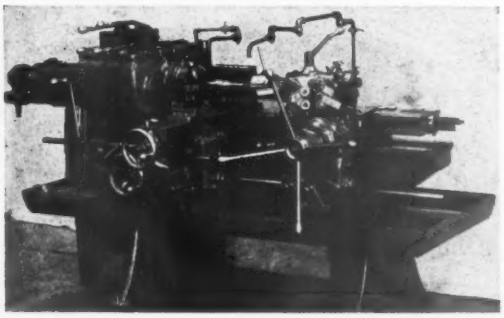
Flag No. 2

This flag comes up from the Maintenance Department. This department turns in records of any machines whose maintenance costs are too high, or represent too much down-time.

Flag No. 3

This flag comes up from the foremen. It is part of my job to keep in touch with the foremen, and get from them at first hand any complaints they may have about any machine which is causing them trouble, or which they feel is not up to proper performance.

Here is 1928's "last word" in ram type turret lathes. This No. 4 had 1 1/2" bar capacity and an all geared head offering 45 to 423 rpm. A maximum of 5 hp. was available for heavy duty work. Today this machine would be obsolete on all counts — power, speed, rigidity, and accuracy.



Flag No. 4

This flag is one I have in my own department. Part of my job is that of keeping a record of the date upon which every piece of equipment was bought, the extent to which it has been depreciated on our books, etc. The minute any machine in our plant passes the ten-year mark I put a flag on it, as a sign that it should be at least considered ripe for a replacement.

Flag No. 5

It is the responsibility of my department to keep informed of new methods, processes, and equipment, and to make recommendations on the basis of savings; also to be in a position to recommend the best and most productive equipment when replacement is required because of condition.

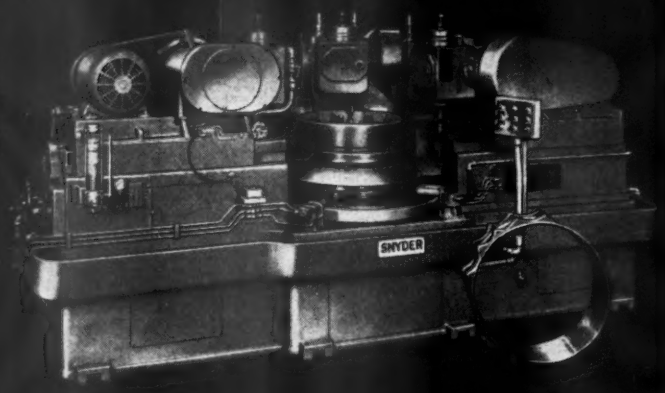
Now—these five flags together provide a complete list of all the machines which should be considered in connection with our company's continuous modernization program.

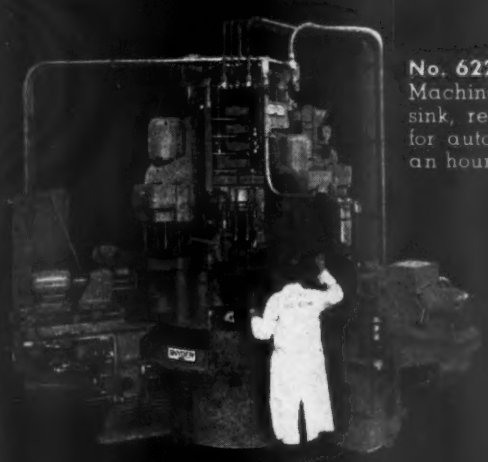
From this overall list, we prepare what I might term the "must" replacement list. These are the machines which, on the basis of the five flags, demand replacement at the earliest practical date.

The next step is to present this list of "must"

. . . Continued on page 100

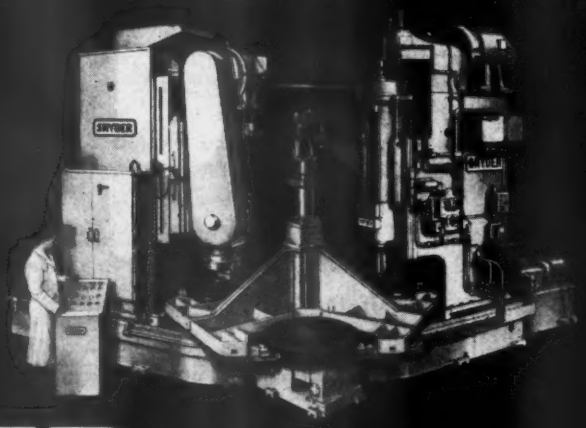
No. 68326—A three-way machine to profile mill four rows of lugs on a compressor casing for jet engines. 135 minutes are used to perform this operation in 3 steps.





No. 62207—Six Station Center Column Machine to drill, counterbore, countersink, ream and tap converter housing for automatic transmissions. 91 pieces an hour at 80% efficiency.

No. 67677—Two-Station, Vertical Column, Boring and Facing Machine to rough bore and face the hub of heavy railroad car wheels. Bore 6¾" x 7" long. 33 units an hour at 100% efficiency.



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CIRCLE INFORM-A-GRAM KEY NO. 70

Automated Grinding

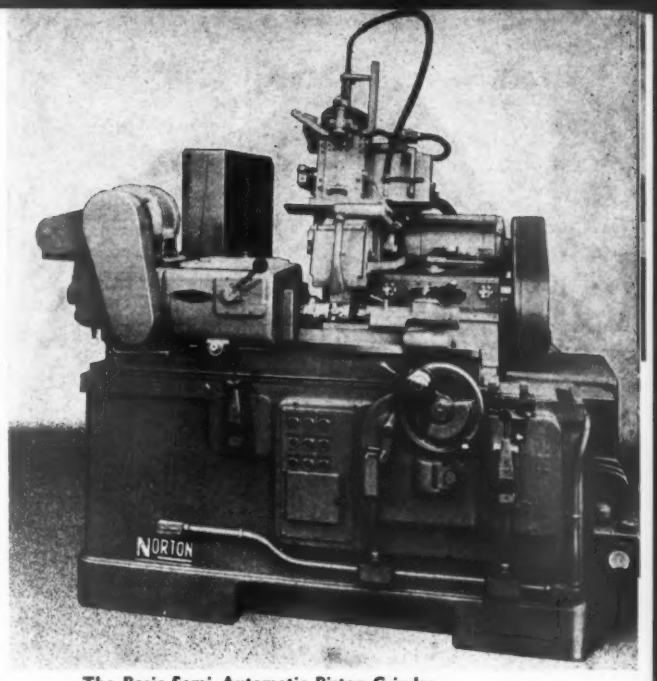
THE AUTOMATION of high-production piston grinding is now being developed by Norton Company. The system proposed will provide conveyorized automatic loading and unloading of the basic 6″ x 8″ semi-automatic piston grinders, and will thus provide for fully-automatic, continuous production.

Below is an artist's conception of the proposed automated piston line. The turned pistons, leaving the lathes in an unregulated fashion, will be moved by machine level conveyor to an elevator, which will carry them up to an orientator for proper line-up before being fed onto the overhead conveyor. The orientator is shown at upper left in sketch below.

The overhead conveyor will consist of a Syntron vibratory track, along which the orientated pistons will move to one of the three load positions. The mechanism for loading pistons in and out of the machine will have jaws at each end of a rotating arm shown at upper right in sketch below.

In operation, a piston at the loading station will be pushed forward and grasped by the loading arm jaws. The double-arm will oscillate down, removing the finish ground piston from the machine by the jaws on one end of the arm, and will then swing down the unground piston into proper position in the grinder. The hydraulic footstock will then come forward to pick up the piston on centers. The arm will then return to the loading position, and will deposit the finish ground piston on the lower level of the Syntron track. The arm then rotates, and the cycle repeats.

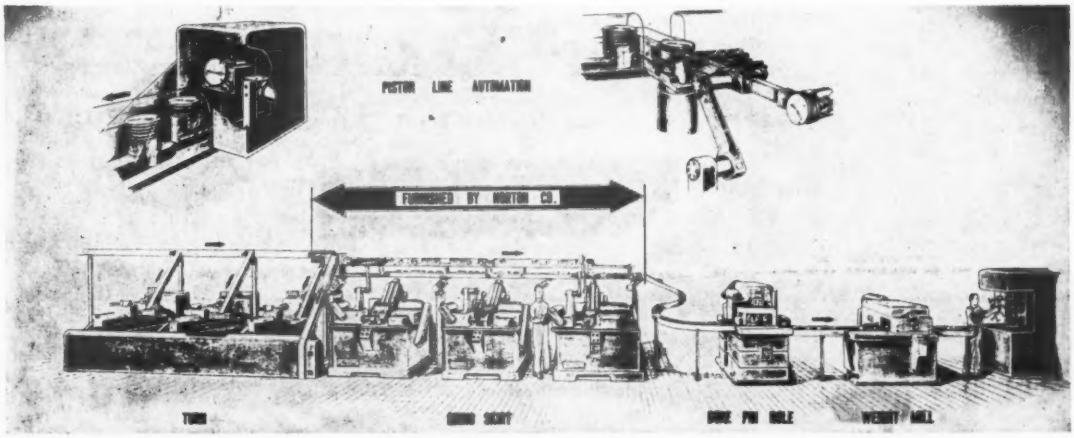
When a predetermined quantity of pistons have been ground, the wheel will be automatically trued. And, the amount trued off the wheel will be compensated for automatically. With an automated setup, it will be necessary to true more frequently than would be required by normal practice, in order to compensate for wheel wear before parts get out of tolerance.



The Basic Semi-Automatic Piston Grinder

The automatic grinding cycle on these piston grinders includes rapid advance of the grinding wheel, simultaneous with start of work rotation and coolant flow; a momentary deceleration; an adjustable grinding feed; dwell for size and finish; and rapid retraction of the wheel — all without effort on the part of the operator. The automatic cycle is governed by an electric timer pre-set for the particular time period necessary to produce the accuracy of size and the finish desired.

Each grinder in this automatic line will be able to shut down, when necessary, without interfering with the production of the other two.



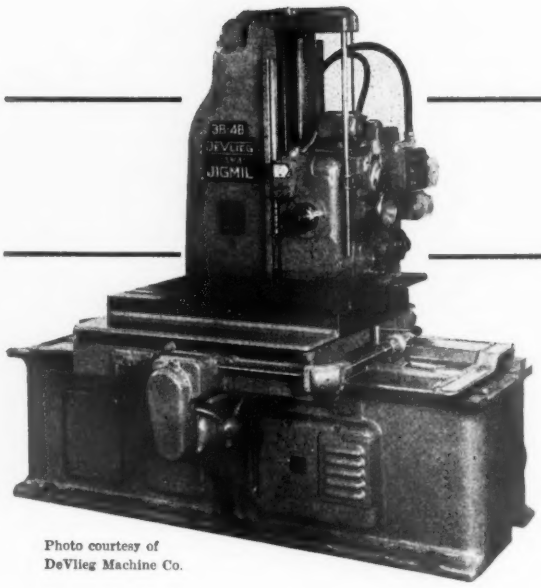


Photo courtesy of
DeVlieg Machine Co.

The Spiramatic Jigmil — a basic precision machine — was developed for efficient use of cemented carbides. Bed, column, and spindle head are of rugged construction. Mounted tools are properly aligned, power locked and unlocked in the hollow machine spindle bar — by pushbutton control.

by Watson N. Nordquist
Technical Editor

Cemented Carbides

PERFORM BETTER ON BETTER MACHINES

THIS HAS BEEN REFERRED TO AS THE CARBIDE AGE. It is the age of higher cutting speeds, of higher rates of metal removal, of higher machine tool productivity. Cemented carbides make this possible! But, you do not push the carbide tool by hand. You put it in a machine tool. And the machine tool you pick to do the job will make a lot of difference in how that carbide tool performs.

Carbide benefits can be enjoyed in every machining area. They're yours to enjoy. The extent to which carbides pay off is largely dependent upon the suitability and the quality of the machine tool equipment. You can put carbide on a 10-year old machine, or one much older than that; and a smart tool man will make it work. But, no matter how you recondition or modify that 1944 machine, it just hasn't the capability of a 1954 machine.

Why is this so? You probably have the answers better than I do. In 1944 — well, that was a war year — but in that period the possibilities of machining at high speeds were just being tapped. The necessity for high production on items of war materiel spurred this exploratory work in the upper regions. People who had never used carbide before had just begun to. People who had used carbide for simple single point turning were applying it to other operations for the first time.

Let's face it. The machine tools made back at that time just weren't made for carbide; not by today's standards. There just weren't enough people around who wanted to use carbide and were willing to pay for the better equipment on which to use it. This is no discredit to the machine tool builders; the market had not yet been established. The carbides back in that era weren't so hot either.

Machine Tool Evolution

There's another important factor in this 1954 vs. 1944 picture. And that is the normal evolution of a product. The machine tool builder, just as the builder of any other product, must

Industry today CAN NOT AFFORD to overlook the cost-reduction and profit-building potential offered by carbide tooling in every machining area — on every type of machining operation, on every type of machine tool, on every type of material to be cut. BUT, this potential can be fully realized ONLY on late model machine tools BUILT FOR CARBIDE.

tap the technological developments of many sources. He is dependent upon the advancements made by his suppliers, just as you are dependent upon the advancements made by him.

Within this last decade, progress made in every quarter has enabled the machine tool builder to offer now in 1954 a product infinitely better than he was able to back in 1944. He has at his disposal the tremendous advancements of metallurgy — new tool steels, Meehanite, better bearing steels, wear resistant bronzes and cemented carbides, other powder-metals, nitriding, low temperature stabilization. He has at his disposal the tremendous advancements in the field of electrical controls and motors — infinitely variable speeds, better lamination steels, oil-tight enclosures, magnetic brakes, thermistors, stepping switches, magnetic clutches, high strength permanent magnets, electronic components. He has at his disposal the tremendous advancements made in high speed bearing design, in phenolics, in foundry work, in hydraulic seals, in automatic chucking, in mist lubrication, in helical gear design, in dynamic balancing, in vibration isolation, in hydraulic drives.

Look at today's machine tools, and you will see these advancements at work. The 1954 machine tool is infinitely better than the 1944 machine; in fact, it is better than the 1953. Generally speaking, product improvement does not wait for a new model. Isn't that true with the product you make?

Remember, too, today's cost per square foot of plant facility . . . and what higher productivity per machine can mean in this regard. Remember, too, the rapid amortization of machine tool cost made possible by carbide tools operating at higher rates of metal removal, with less downtime, and with less scrap and salvage expense.

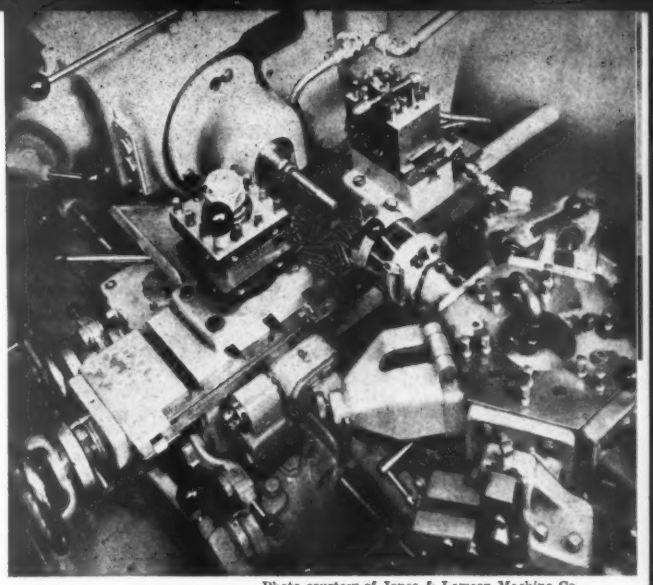


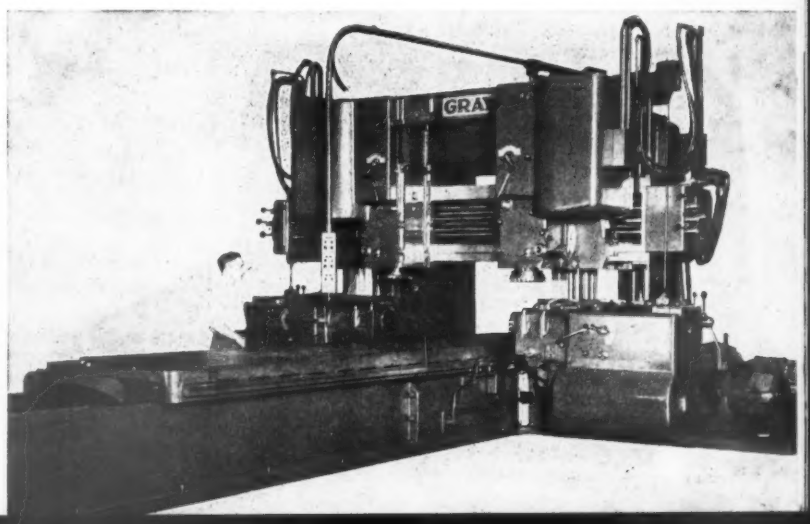
Photo courtesy of Jones & Lamson Machine Co.

All-carbide tooling on a J & L No. 3 universal ram turret lathe machines a body bound bolt (SAE 1315) at a constant spindle speed of 2000 rpm. Carbide chasers are used in a stock die head. Machine incorporates hardened and ground steel ways, feeds automatically disengaged, automatic spindle brake, constant speed motor, and wide range of spindle speeds.

Some people in Industry sit back on their . . . heels . . . and say something like this, "Well, when you put the rpm up another 500 turns, and give me enough horse to carry it, and lop a thousand off the price tag, and . . . come back and see me." Usually, you can look around that man's shop and see machine tools 10, 20, 30 years old. He may even have a profiler made before the turn of the century. Friend, you're not like that are you?

The 1955 machine tools will be better than this year's. But can you afford to pass up these carbide benefits for another year? Pay high machine maintenance costs? Pay for lost production time?

You know, the machine tools-for-defense picture is rapidly changing. And every ranking machine tool builder has a healthy backlog. Is your order in?



Unit head construction is used in the Gray planer-type milling machine. Each head has its own spindle motor, thus each carbide cutter in a multiple-cut setup may be driven at the speed and in the direction most desirable. Spindle speeds up to 1000 rpm may be changed instantaneously. A double planetary spindle balanced flow of power to the cutter through a triple high-inertia flywheel. All sliding bearings are non-metallic to eliminate chatter usually caused by the vibration companion to excessive running clearances.

Photo courtesy of The G. A. Gray Co.

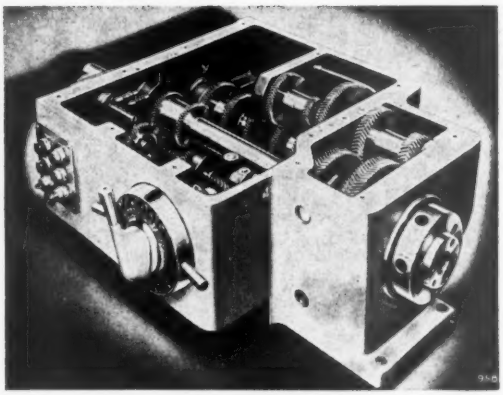


Photo courtesy of The Sidney Machine Tool Co.

The use of continuous-tooth herringbone gears throughout the Sidney lathe 32-speed headstock transmission, plus the use of internal and external gear tooth clutches reduce backlash to a minimum — a must for carbide tooling. All major shafts in the headstock are mounted on anti-friction bearings at three points. Close-coupled and opposed spindle bearings afford maximum rigidity.

TODAY'S MACHINES PERMIT MAXIMUM UTILIZATION OF CARBIDES

MACHINE PERFORMANCE is no better than tool performance. But tool performance—especially carbide—is limited by machine capability. The first requisite is plenty of beef, as the boys out on the floor call it. You need rigidity, higher speeds, adequate horsepower, and ability of the machine to stand up under continuous duty at maximum load.

No machines will have the "best possible" in every respect. I, certainly, do not know what the "best possible" is. We're not naive enough to think you'd believe me if I said otherwise. Together we can look at some of the steps being taken to provide what is necessary for maximum utilization of carbide tooling. These are points in machine design that you might watch for.

An important fact to keep in mind is that some shops will need a machine to run 16 hours a day, day after day, in continuous production at near-capacity loads. Other shops need a machine to run intermittently on relatively light work most of the time and at capacity occasionally. One machine may be designed for the first market; another machine, of same size and function, for the second market. Both can use carbides effectively; choose judiciously. Also, don't expect an engine lathe and a jig borer to be built alike.

What do you look for? Machine tools must be rigid. Deflection of workpiece or tool must be avoided. Vibration must be kept to a minimum. Otherwise, the cemented carbide which is inherently of highly stressed metallurgical structure, will crack or shatter. The carbides are improving in impact strength, fatigue resistance, and other respects. The use of rigid tool steel shanks and cutter bodies is becoming better known. Better grinding and brazing practices, and mechanical-holding methods, are exerting their influence. New cutting fluids help carbides to resist greater forces. Tool geometry is developing into a science. But the first requisite remains—rigidity.

More Efficient Transmission of Power

ALL SLIDING gears, three and four bearings on a shaft to eliminate deflection, and complete elimination of splash oiling which is basically inefficient are responsible for the superlative performance of present model 25" and 32" Pacemaker engine lathes.

Both these sizes in the present line handle the full overload of a 50 hp motor, while previous designs were limited to 40 hp. Whereas those early lathes would remove only 50 cubic inches per minute (of SAE 1045 steel) with the 40 hp motor overloaded 20%, today's lathes remove 100 cubic inches with the 50 hp motor overloaded 20%!

Models made prior to 1947 operated at speeds up to 400 rpm; present machines have a top speed of 750 rpm. The older machines offered selection of 12 speeds; present machines offer 27. The greater number of speeds allow cutting rates, so vital to good carbide tool life, to be carefully controlled.

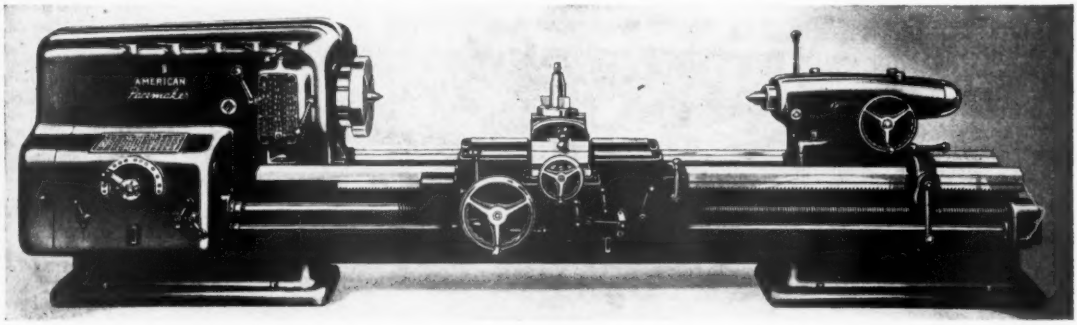


Photo courtesy of The American Tool Works Co.

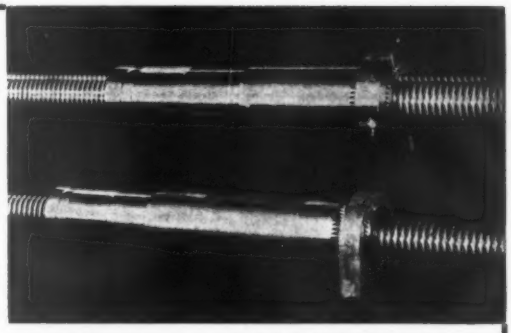
Carbide Milling

With the introduction of carbide tools to American industry in the early thirties, there was a noticeable change in the design of machine tools. This trend was, in general, gradual but was accelerated by wartime demands and by metal-cutting research.

That most milling machines today are designed primarily for carbide milling is obviously indicated by the more highly powered spindle and feed mechanism as well as by the incorporation of a built-in flywheel. Not as obvious are the strengthened, more rigid, component members of the machine along with heavier gears, shafts, and bearings. To reduce the non-cutting machine time an automatic cycle arrangement and centralized controls introduced to take advantage of the potentialities of carbide milling, principally shorted working time.

These stronger, more rigid, and more powerful machines not only promote better carbide milling but also increase the production obtainable with high speed steel and Stellite cutters. Production tests with h.s.s. cutters frequently have shown approximately 100% increase, in number of parts made per cutter resharpening, on a 1953 model machine in comparison to a 1942 model under otherwise identical conditions.

Along with the constant effort of machine tool builders to improve and make their machines adequate for the greater tool forces and and power requirements of carbide milling, the design of carbide cutters and the properties of the carbides themselves have been steadily improved. Today's carbide face mills are often specially designed for heavy steel milling jobs, such as die-block milling. Also, carbide end mills and slab mills with helical or spiral teeth are now available. The spiral is formed either during the sintering process or afterward under the application of heat. Carbide cutters with helical or spiral teeth operate with much less vibration and shock than previous designs, and improved chip formation is also obtained. Last, but not least, the improved quality of good steel-cutting grades of carbide is such that tough alloy steels can be milled sucessfully with them.



Extra-long bronze nut and backlash eliminator applied to heavy-duty table feed screws permit effective use of cemented carbides on climb milling.

Some of the early, enthusiastic notions, for example, that any milling machine could do successfully a heavy carbide milling job on steel if only it were fitted with a flywheel and some kind of carbide cutter running at the highest possible speed, are no longer generally accepted. In milling machines designed primarily for machining of ferrous materials, the top spindle speed is around 2000 rpm. A distinctive type of knee-type carbide milling machine has been developed for milling light metals with high spindle speeds up to 7200 rpm and a feed of up to 300 ipm.

In addition to the design of machine and cutter for carbide milling, both of which must be adequate, the workpiece setup must provide a practical maximum of rigidity. Cutter grinding must receive careful attention with regard to rake and clearance angles, to insure an optimum rate of stock removal and good surface finish. Carbide milling does produce more workpieces in a shorter time but it requires more engineering not only on the drafting board but also in the tool room and shop.

—Dr. A. O. Schmidt
Chief Research Engineer
KEARNEY & TRECKER CORP.
Milwaukee, Misc.

Modern Machines Have Rigidity

How does the machine tool builder provide the needed rigidity? By better control of fits and tolerances. By stabilization of metals on running parts to prevent grain growth, warpage, and binding. By use of friction-free phenolics and of hardened tool steel, ground and lapped, on ways and other sliding members—materials that will hold dimension and finish for long periods, that will not be roughed up by chips, that will require minimum maintenance. By greater bearing area on moving elements such as tool carriages, moving heads, tailstocks, reciprocating tables. By lowering the center of gravity on rotating work.

Massiveness alone is not the answer. Massiveness may help to compensate for lack of other qualities. Of course, it is of great importance in the base of a long machine, for instance, to adequately support widely separated machine units.

Look for weak points . . . sources of backlash. A few of the machine builders have concentrated a great deal of attention on this one point. Where feed screws are used, check for the presence of backlash eliminator devices.

Herringbone gears are replacing spur gear drives. Constant-pressure, shock absorbing hydraulic drives are coming into greater use.

Self-driven moving heads are widely-used on special machine tools in automated production lines. Standard machines feature independent drive units for spindle, table, or carriage. V-belt drives help isolate vibrations from the spindle.

Vibrations are being analyzed; sources located and isolated. Do your part, too. When the machine is installed, do not place it alongside a heavy-impact press or similar machine. Mount all machines possible on vibration mounting pads. Apply the best available know-how to your tool design and set-up.

Watch for sources of side thrust, and deflection. Table drives for massive heavy workpieces, especially where the table is wide, should be balanced. That is, there shouldn't be a lone drive unit set off to the side where the load is carried considerably off center.

This discussion of machine tool requirements for better performance of cemented carbides will be continued in an early issue of this magazine.

Dual Power Milling

AN OUTSTANDING EXAMPLE of machine tool evolution, keyed to the effective utilization of carbide tools, is found in the Cincinnati Nos. 5 and 6 Dual Power and High Power dial type milling machines.

In the High Power machines—plain, universal, and vertical, the maximum horsepower (25) is available at all spindle speeds.

Dual Power machines—plain and vertical only—are driven by higher horsepower motors. Through automatic controls within the column, one-half (25) of the available horsepower is delivered for the six lowest spindle speeds, while the full horsepower (50) is delivered for all higher speeds.

These machines were designed for shops requiring ample power in taking heavy cuts on large work, with either h.s.s. or carbide cutters.

Machines provide 24 spindle speeds, 14 to 1400 rpm (100:1 ratio), and 30 feeds, ¼" to 60" per minute (240:1 ratio). These wide ranges, plus the high horsepower, cover all practical requirements for greatly diversified toolroom and production milling, using all types of cutter and work materials.

A completely automatic table cycle provides for reciprocating table with reverse out-of-feed and with safety stop, thereby adding to production capacity.

A feature essential for rigidity and accuracy when using carbide cutters on long, heavy work is the exceptionally wide bearing surface of the knee. Here the bearing surface of the saddle is as long as the table travel, providing table and workpiece support needed to increase feeds and speeds and depth of cut.

Other features contributing to tool performance are the automatic backlash eliminator on the table feed screws (activated while down milling; free at other times), and the Dynapoise over-arm designed to smooth out the cutting action and to damp self-excited chatter.

The evolution of these machines offering many features not available in a comparable machine of 10 years ago is illustrated in the accompanying table, presenting comparative data on a 1954 No. 5 plain Dual Power and a 1944 No. 5 plain High Power.

The photo shows the No. 5 plain Dual Power milling a chrome-nickel steel (SAE 3145) bar. A 2" wide x 1¼" deep slot is being milled at a feed rate of 14½ ipm, with an 8" carbide cutter rotating at 219 rpm.

Comparison of 1954 and 1944 Milling Machines

	New #5 Plain Dual Power	Old #5 Plain High Power
Table		
Working Surface	94½" x 20"	79" x 21"
Size Overall	94½" x 20"	83" x 21"
Spindle Speeds {Number	24	16
Spindle Speeds {Range	14 to 1400 rpm	16 to 448 rpm
Feed Number	32	16
Feed Range {Longitudinal	3/8" - 90" per min.	3/4" to 30" per min.
Feed Range {Cross	3/8" - 90" per min.	3/4" to 30" per min.
Feed Range {Vertical	9/32" - 22½" per min.	3/4" to 30" per min.
Live Power Rapid Traverse		
Longitudinal	150" per min.	100" per min.
Cross	150" per min.	——
Vertical	37½" per min.	——
Over arm	Rectangular Dynapoise	Rectangular
Drive		
Motor Rating	50 hp	20 hp
Net Weight	15,600 lbs	11,500 lbs

Photo courtesy of The Cincinnati Milling Machine Co.

Minimum Backlash

SIMPLICITY OF OPERATION and freedom from machine-caused tool troubles, are found in the Sidney 16" Model 32 tracer lathe.

First of all, the use of continuous-tooth herringbone gears throughout the headstock transmission, plus the use of internal and external gear tooth clutches sliding on splined and ground shafts, reduce backlash to a minimum—a MUST for using cemented carbide tools. All major shafts in the headstock (including the spindle) are mounted on anti-friction bearings at three points. Close-coupled and opposed spindle bearings afford maximum rigidity.

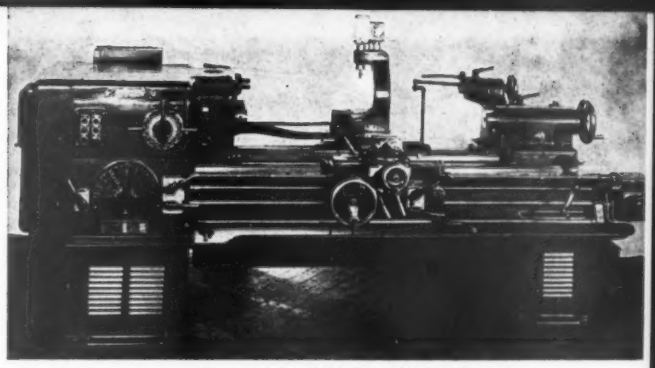
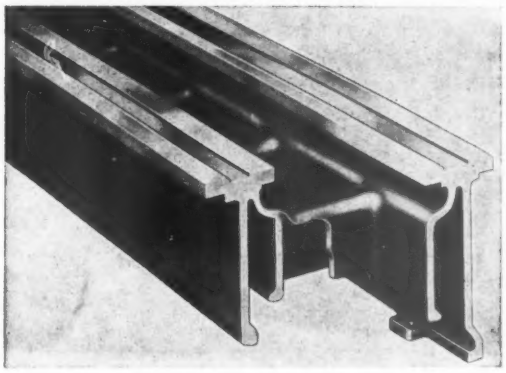


Photo courtesy of the Sidney Machine Tool Co.



As shown in the photo, four-wall bed construction with double cross girts provide an extremely rigid base for permanent work accuracy.

Spindle speeds range up to 1500 rpm, with feeds from .0028 to .174 ipr. Automatic forced lubrication, extra heavy duty tailstock for maximum support of work between centers, and ample bearing area for carriage rigidity are also provided. The sensitive Fluid Tracer head adds to the versatility of this modern machine tool.

Milling the Airfoil

ONE OF THE PROBLEMS peculiar to this Jet Age has been the development and maintenance of production on gas turbine engine compressor blades. Less than 3 years ago an entirely new machine—the Ex-Cell-O Precision Profile Miller was introduced for milling the complete airfoil form.

This machine was specifically designed to use carbide-tipped milling cutters, and incorporates many refinements conducive to long life of carbide tools and the highest production possible.

In the photo, roller-type steady rests are shown in engagement with the work. They prevent deflection of the blade while the carbide-tipped cutter is working. Work does not rotate, but travels lengthwise across the milling cutter, indexing after each cutting stroke. The machine is equipped with an automatic pressure coolant system.

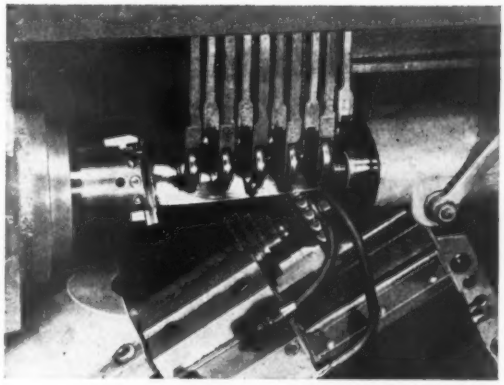
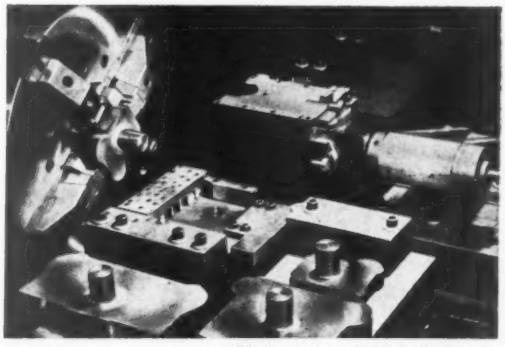


Photo courtesy of Ex-Cell-O Corp.

Variable Speed

IN ANSWER to the demand for ever-better surface finishes, variable speed motors on this Simplimatic automatic lathe provide constant cutting speed and, therefore, a more uniform, more acceptable surface finish as well as longer carbide tool life.

Tools are used to maximum efficiency in this flexible setup producing 32 different sizes of punch holder for Danly die sets. All 32 sizes are securely held in the same duplex chuck having two pairs of self-centering jaws that work independently of each other. All 32 sizes are handled simply by inserting or removing cutting tools as necessary.



Photos courtesy of Gisholt Machine Co.

On the finishing operation, carbide tools mounted in the rear slide give a smoother, more uniform surface finish due to the variable speed motor, which increases spindle speed to compensate for the decrease in diameter as the rear slide approaches the punch holder shank.

Floor-to-floor time for workpieces shown is only 2.33 minutes.

DESIGN . . . . . CONSTRUCTION *of* QUICK-CHANGE TOOLING

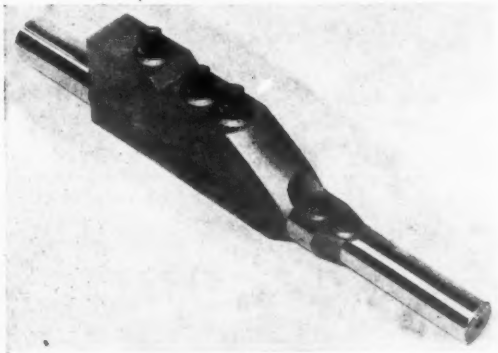
The basic design and the production methods employed by the DeVlieg Microbore Company in the manufacture of Microbore units are noteworthy in that the end result, in the hands of many users, has come to be, virtually, a tooling system, offering appreciable versatility in setup, and economies in terms of tool procurement, maintenance, change-overs, and downtime.

Manufacturing operations calling for precision boring, turning and facing, not only have to be performed on machine tools capable of corresponding precision, but the cutting tools themselves have to be equally capable.

The cutting tools have to be capable of being set to blue print dimensions with ease and accuracy; and adjustments for wear and for resetting after sharpening must be easily accomplished to the initial accuracy. These latter are particularly important in long-sustained production runs when "time out" for tool sharpening and setting means that neither machine or operator is earning.

The accompanying pictures of Microbore tool designs and of some of the setups in the DeVlieg plant where the units are manufactured have been chosen to show the variety of end-use applications which these tools can meet, and to give an idea of the DeVlieg methods of manufacture.

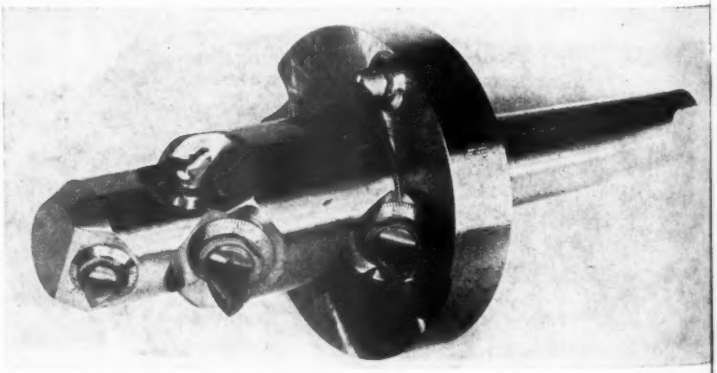
This array of tooling for any one or all of six Bore-Matics is used by the Apex Electrical Manufacturing Company, Sandusky, Ohio, in the production of 19 different parts for aircraft engine starters and generators. There are seven Microbore cartridges built into the tools shown. The Apex-made tooling designed around basic machines consisting of boring heads and cross slides, accomplishes the most in the way of interchangeability with the shortest possible down-time.

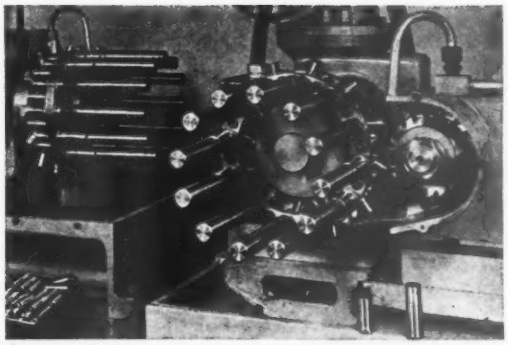


On a cast iron fan housing, the above turret lathe tool is Microbore-equipped to face a 7" diameter pad, rough and finish a 6.377-6.378 bore, and rough and finish a 2.125-2.127 bore.

◆

At the right is a taper shank cluster type tool holder incorporating several Microbore cartridges. Together, they do a job on a cream separator component of boring two diameters, and facing and chamfering two shoulders.





A close-up of one of the special machines, with rotary drum type of continuous feed, designed and built by DeVlieg for the various milling operations on Microbore cartridges. These operations include milling the seats for the carbide tips. The machine line is set up on a mass production basis.

Each unit is made up of a threaded tool bit cartridge, a cone-shaped adjusting nut with peripheral graduations, and a lock screw and washer assembly. The conical seat in the tool holder which receives the cone-shaped underside of the adjusting nut, and the generous amount of thread engagement between the adjusting nut and the tool bit cartridge, insure the extremely rigid support essential to efficient operation of carbide tools on roughing and finishing cuts.

It can be observed throughout the illustrations that some of the units are mounted at 90° to the axis of rotation and some are mounted at other angles to the tool axis. Also, note that the Microbore units vary in size. Regardless of these differences in mounting angle and in size, the graduated dials of all adjusting nuts are so calibrated as to provide direct readings on diameter. A dial movement of one graduation represents .001" on diameter. And the vernier scale adjacent to each dial permits a setting of .0001" on diameter.

The maintenance of Microbore cutting tools has been as thoroughly engineered as the initial design and construction. A special grinding block is available for each size of Microbore unit. The unit is located and locked in the grinding block in exact duplication of the way the unit is mounted in the tool holder. This insures that with the tool grinder table and protractor set to the desired angles, the tool is not only ground to the correct angles for a given job but that when the unit is remounted in the tool holder the angles are accurately re-

This "Toccotron" installation in the DeVlieg plant is where the carbide tips are brazed on Microbore tools. The work fixture in the foreground has two 180° stations. While one cartridge is within the induction heating coil, the operator unloads and loads the other station, thus expediting the brazing operation.

Threading the Microbore cartridges is done on this Reed thread rolling machine. The operator merely has to feed the piece by hand through the guide bushing as illustrated and the machine automatically ejects upon completion of the threading operation.

lated to the surfaces to be machined.

These engineering features of Microbore tools, the precision to which they are made, and the accurate, repetitive performance of which they are capable, have resulted in a high degree of systematization by users.

One of the largest Detroit manufacturers of a precision end product has a compilation of work sheets covering all Microbore tools used in production. These sheets show the manufacturer's tool number, the part number, the Microbore tool number as evolved by DeVlieg, as well as the style and quantity of Microbore units used in the make-up of the tool. In turn, the DeVlieg blueprint corresponding to the customer's tool number carries all information as to the angular grinds specified for each unit in the tool. This has resulted in an excellent system for controlling tool settings and reducing machine down time.

. . . *Continued on page 172*

SERVICING "AUTOMATION"

by William H. Harris
Vice President, Engineering
MICROMATIC HONE CORPORATION
Detroit, Michigan

WITH ALL MACHINE TOOL BUILDERS in a race to produce more intricate and labor-saving equipment, Micromatic Hone Corporation has realized the existence of an accompanying need. For every stride taken in the direction of complete automaticity, progress must be maintained in the capacity to service this type of equipment.

The design engineer is becoming increasingly aware of the need for providing for ease of maintenance to keep machine downtime to a minimum. Scales, calibrated dials, and even micrometer adjustments are being utilized to increase accuracy and ease of operation.

In addition, the word "safety" has taken on a new connotation. In the past the safety objectives of the machine tool builders were concentrated on protecting the operator; now, safety efforts have been extended to include the machine as well. The inter-relationship of equipment on the automation line has made machine protection as vital to the worker as it naturally is to the manufacturer. A major breakdown could result, not only in lost production, but lost time and wages to the workers on the entire line affected.

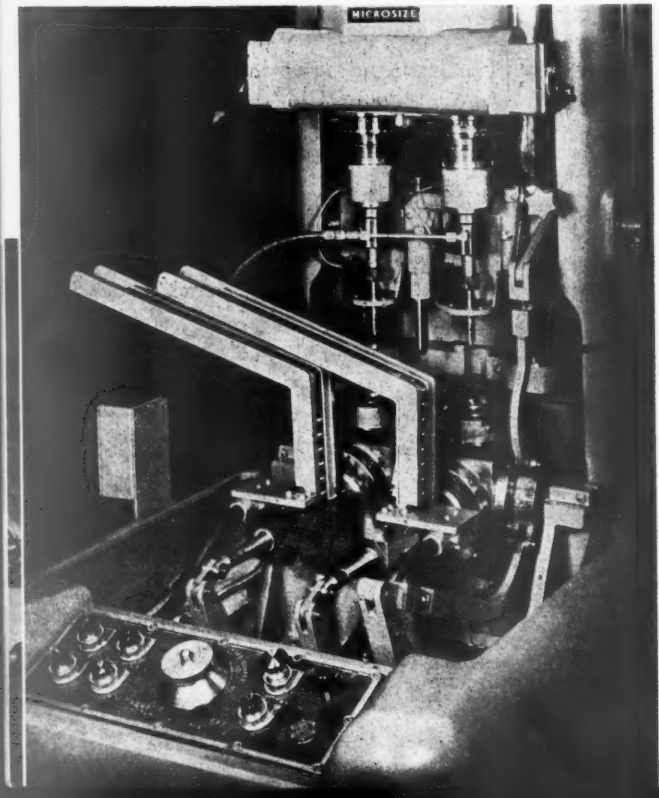
Consequently, Micromatic engineers are adapting various types of mechanical and electrical mechanisms to their machines in an effort to guard against damage, to either the machine or operator, should the normal cycle go awry.

Examples of such automatic "guards" are:

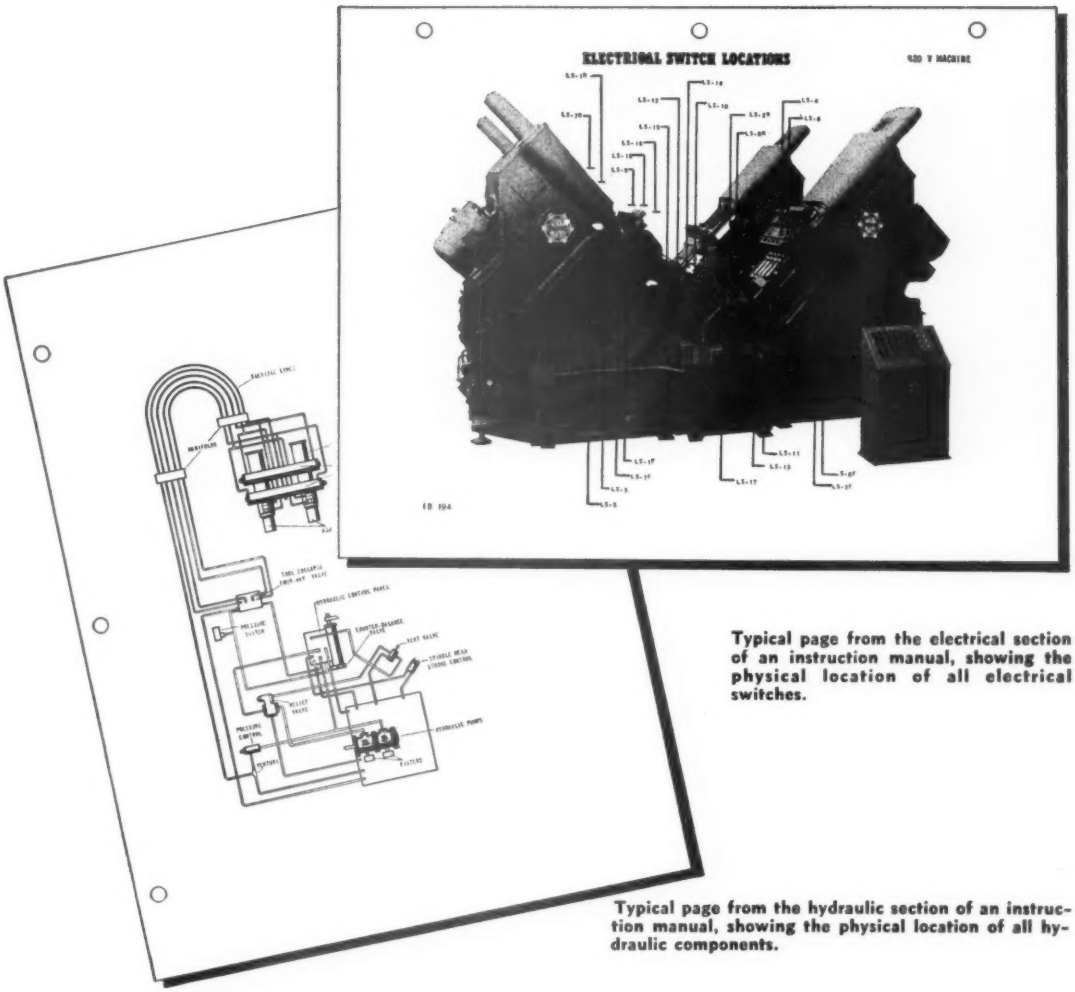
1. The Stone Wear Indicator, a device which not only designates the approximate amount of stone life remaining in the tool, but also shuts off the machine as soon as the abrasive is completely worn down. A light comes on to tell the operator why the machine has "dropped out" of the automatic cycle.
2. Automatic selection and measuring of the workpiece before Microhoning to protect against machine and tool damage.
3. To prevent damage from improper lubrication, signal lights inform the operator when oil levels become dangerously low. Should this warning go unheeded, the machine's automatic cycle is ended.

Because of the complexity of the automation picture, it is not possible to provide for every specific contingency. In anticipation of unprecedented problems which may arise, and to provide the "means" of coping with them, Micromatic has accelerated its field engineering program and serves as follows:

1. Adding trained personnel to its field organization.
2. Increasing the contents and scope of its instruction manuals to include J.I.C. electrical, hydraulic and pneumatic diagrams, and sequence of machine operation.
3. Training customer personnel in the operation of the Micromatic equipment. If the customer so desires, training programs



Typical automatic honing machine provides for automatic loading, sizing, indexing, and ejecting of parts. Tolerance better than .0003" are held while removing .002" to .003" stock.



Typical page from the electrical section of an instruction manual, showing the physical location of all electrical switches.

Typical page from the hydraulic section of an instruction manual, showing the physical location of all hydraulic components.

can be arranged either at his plant, or at the Micromatic home office.

4. Supplying bulletins covering operation and repair parts of purchased items used on the machine.
5. Supplying scaled-down drawings of all machine sub-assemblies and parts including part nomenclature and Micromatic part numbers.
6. Supplying diagrams which show the physical location of hydraulic and electrical parts, thus serving to speed trouble-shooting and maintenance.
7. Compiling a recommended spare parts list in addition to the complete standard parts listing.

In effect, this overall program enables the customer to become more familiar with his equipment, the functions of the components, and servicing techniques . . . resulting in greater operating ease, increased operator and machine safety, and an increase in machine production time. ◆ ◆ ◆

Significant Future Developments to Lower Costs of Short-Run Piercing

In recent years, great strides have been made in the low-cost piercing of small lots of panels, chassis, housings and similar sheet metal parts and components. Punch and die setup time has been reduced to a few minutes, and manual layout has been eliminated. In addition, material positioning gauging arrangements have been perfected which permit one-man operation to consistent close tolerances.

These developments have made it possible for industry to produce one piece, a dozen, several hundred, or a few thousand of a kind at costs approaching long-run tooling. The cycle of development is still on the up-swing. As industry is applying the turret punch press to an increasingly wide number of applications, new principles are being incorporated which will reduce still further the cost of producing these short-run products.

—T. A. Wiedemann, Vice President
WIEDEMANN MACHINE COMPANY
Philadelphia, Pennsylvania

CONTROLLING MACHINE TOOLS - -

ELECTRICITY, long the source of power for machine tools, is being used to an increasing degree for the effective control of these machines. For years, electricity used in conjunction with hydraulic pressure switches have protected machines by signalling clogged oil filters or low oil levels. But electrons have moved beyond the realm of power and protection to the field of control.

For example, electrical control is the basis of the two-power-level feature of Dual Power milling machines. The high horsepower provided to permit optimum use of carbide cutters, Figure 1, could damage the gear trains when operating in the lowest rpm range because the maximum torque for each successive spindle speed is increased as the speed is reduced. Torque delivered to the cutter is limited at the lowest speeds by a current relay in the power circuit which reduces the maximum horsepower available to the transmission.

The cutting speeds required when milling aluminum with carbide, 6,000 to 15,000 feet per minute, pose a problem in obtaining high spindle speeds. One solution lies in a shell type built-in motor in which the rotor is assembled to the machine spindle, Figure 2, and a variable frequency drive to change spindle rpm. On one milling machine with such an arrangement, power and speed have been varied from 10 horsepower at 1800 rpm to 50 horsepower at 10,800 rpm. Another has a speed range of 6,000 to 36,000 rpm. For these unusually high speeds the bearings are mist lubricated and water cooled.

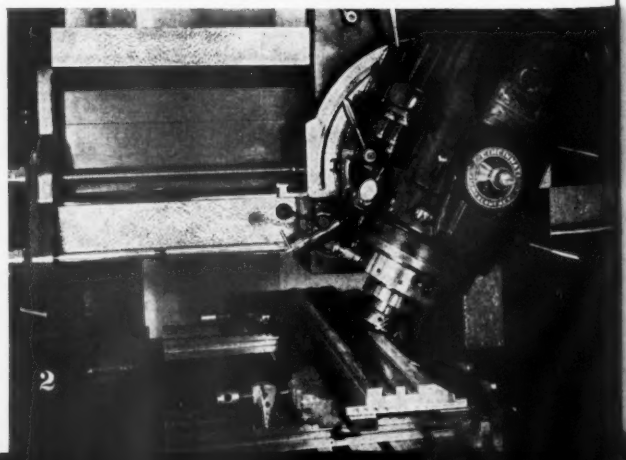
In controlling precision grinding machines through automatic cycles, electricity has proved invaluable. Grinding machines can be equipped to true wheels automatically after a preselected number of pieces have been ground. An electric counter triggers the truing mechanism; the circuit controls movements of the diamond across the face of the wheel and infeeds the diamond in preparation for the next pass.

On some machines the grinding wheel cross slide is automatically moved in to compensate for the reduced diameter of the wheel. Through electrical control of both diamond and wheel infeed, it is possible in some cases to dress the wheel while grinding the workpiece. And it is further possible to maintain a constant surface speed on the wheel, though it is reduced in diameter after many dressings, by a circuit which increases the wheel motor speed automatically. Figure 3 shows the follower wheel whose lever is linked to a pawl device which adds field resistance to the drive motor. These features combined with a loading apparatus and a sizing device can make a precision grinding operation fully automatic. For instance, on the Micro-Centric grinder shown in Figure 4 the operator has only to supply parts and remove finished pieces from an ejection tray, while the machine loads, grinds, tarries, ejects, trues the wheel, and holds size—all automatically.

When grinding an unbalanced part, such as the pin diameter of a crankshaft, it is often necessary to have the work stop its rotation within a few degrees of the same spot every time. This can be accomplished by means of an electronic automatic position stop which uses a contact on the spindle and a leaf spring switch. This makes it possible to load and unload without using the jog button. Even when the workpiece is symmetrical, this simple device can be used to eliminate fumbling when

A conventional single speed motor is used on the Cincinnati Dual Power types.

This spindle winds up to 10,800 rpm. The motor is water cooled.



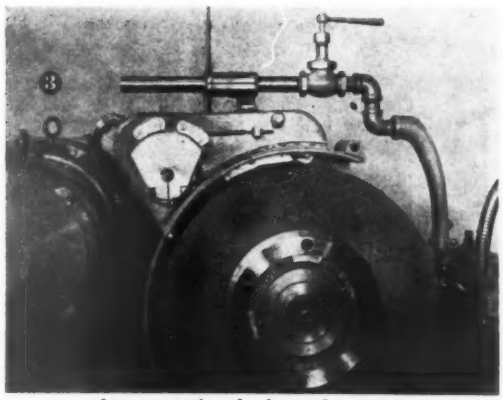
ELECTRICALLY

locating a dog against the driver pin.

Electricity is also used extensively to insure operator safety on machines of all types. Cincinnati Vertical Hydro-Broaches, for example, are equipped with double preset cycle control buttons which must be pressed with both hands to start the broaching cycle or to initiate the repetition of the cycle. On Hydroform deep drawing presses, an effective safety is to be found in the lights used to illuminate the area under the flexible die member. These lights, which facilitate loading or unloading, are turned on only when the dome is up and locked in place. And on all current model machine tools, there are a number of small, but important safety devices such as the interlock switches on gear box covers.

Occasionally, electricity provides both power and control for a machine function. In the case of the roll grinder, Figure 5, the long carriage movements are obtained directly from a variable speed reversing motor, thus eliminating cumbersome clutch and gear arrangements. This motor is electronically controlled to obtain infinitely variable traverse rates between ¾ and 75 inches per minute with smooth acceleration and deceleration. Figure 6 shows the electronic control cabinet which is mounted on the carriage.

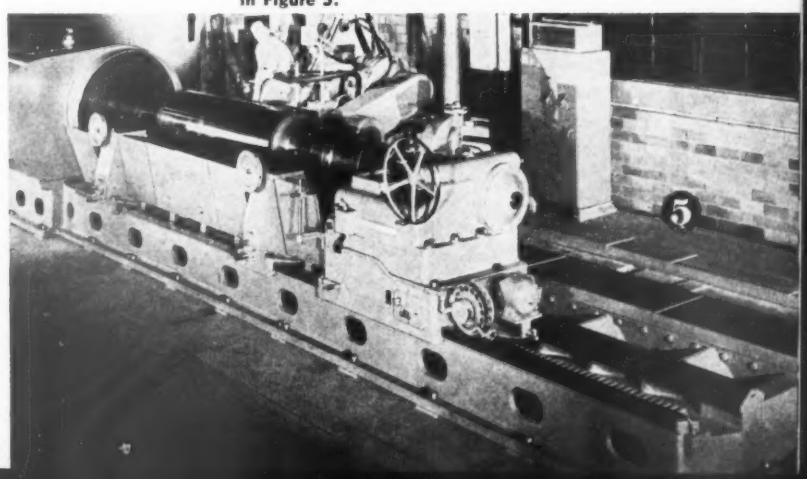
Current machine designs incorporate many more electrical devices than those mentioned. Furthermore, full use is made of the advantages of mechanical, hydraulic, and pneumatic systems—either singly or in combination. Here too, electronics often play an important part. As complete automation is approached in metal-working and as machines become increasingly complex, electrons, in spite of their size, will be called on more frequently to help control machine tools.



An automatic wheel speed compensation device on a Cincinnati 6" x 18" plain hydraulic grinder.

Electrical controls make possible the precise, automatic operation of the Cincinnati Micro-Cemtric grinder.

Close-up of the electric cabinet mounted on the carriage of the machine shown in Figure 5.



Carriage movements are electrically controlled on Cincinnati traveling wheel-head roll grinders.

for Standard Machine Tools

AUTOMATIC LOADING CUTS COSTS

AUTOMATIC LOADING DEVICES that include hopper feeds and automatic inspection devices are proving to be an excellent means of cutting direct labor costs on many types of standard machine tools. This is particularly true on standard machines that provide short cutting times because of high speeds and feeds but have a production rate problem because of the relatively long time required to load and unload production parts.

Automatic loaders cut direct labor costs because they reduce loading and unloading time requirements often permitting an operator to run more than one machine or to do other operations such as burring or polishing in conjunction with the machining operation. Further, automatic loaders can cut capital investment and floor space because of increased machine production rates and reduced machine tool requirements. This is possible because loaders tend to establish a fixed high production rate more or less independent of other factors.

Indicator lights indicating condition of loading of loader magazines on each machine can be provided to enable foremen and other shop supervisory personnel to see quickly what machines are waiting for parts.

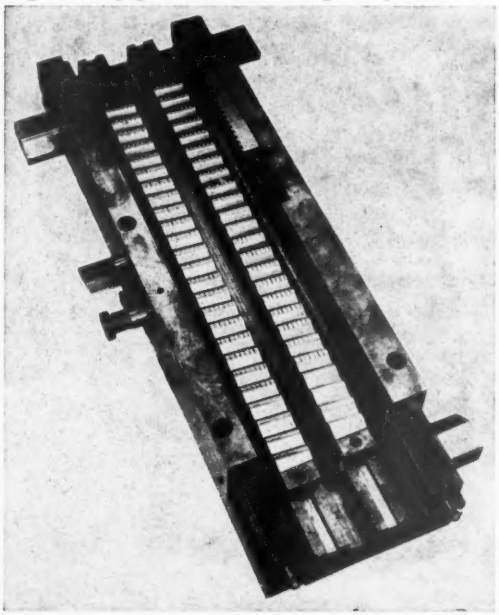


Fig. 2. The surface broaches and broach holder used in connection with the automatic loader shown in Fig. 1.

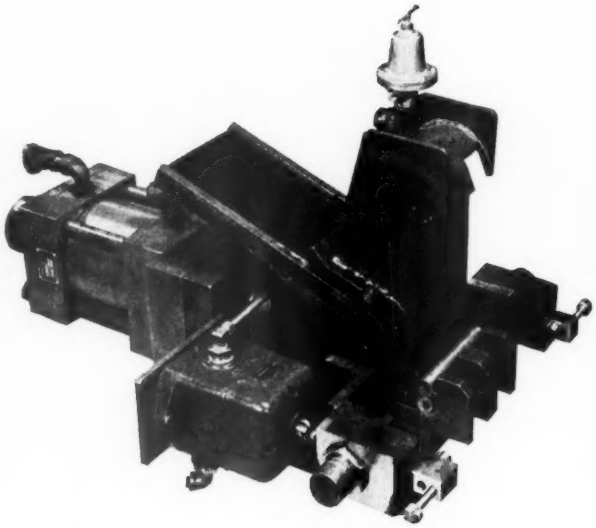


Fig. 1. A Red Ring automatic loader for standard vertical surface broaching machines.

Automatic loaders have another advantage too, in that they promote safety by allowing an operator to load and unload a machine without placing his hands near metal cutting areas.

A typical application of automatic loaders for standard surface broaching machines is shown in Figure 1. This is a type of standardized Red Ring loader made by National Broach & Machine Company, Detroit, for standard broaching machines. The loader positions two, 7/8 in. diameter, 6 in. long, rear axle differential pinion pins in front of a broach on a single ram vertical broaching machine. Two slots and one end are finished on this setup by the broaching process. A single hydraulic cylinder controls the loader. The magazine feed is arranged to automatically gage parts for length, thereby eliminating scrap and avoiding possible machine damage resulting from oversized parts.

The broaches used in conjunction with the loader are shown in Figure 2 in the broach holder. This holder is bolted to the ram of the broaching machine. When automatic loaders are installed on standard broaching machines, the production rate is limited only by the speed of the broaching machine. With this particular loader, production rates of 650 pins

an hour are consistently maintained.

Other Red Ring loaders of a different type can be had for standard dual ram vertical surface broaching machines. These loaders have no hydraulic cylinders but instead use the in-and-out motion of the machine table to actuate and control the loaders. Loaders of this type are particularly adapted to the handling of round parts on which slots or ends are broached.

Another type of standard machine tool in which automatic loaders can cut labor costs as well as capital investment and floor space requirements is the rotary gear shaving machine. This machine like many other types of standard modern precision machine tools produces parts on extremely short cutting cycles. If too much time is used to load and unload the gears, the machine will not operate at peak efficiency. Further, if the parts are not loaded or unloaded with a certain amount of care, critical and expensive tooling components such as work holding devices or shaving cutters can be severely damaged. When this occurs, scrap parts and subsequent costly machine shutdowns for tool changes are necessary.

Automatic loaders on precision machines with expensive tools can often more than justify themselves because of the smooth, consistent and efficient manner in which they present the work to the cutters and remove the work from the machine.

A typical application of automatic loaders for standard rotary shaving machines is the Red Ring slide-type loader shown in Figure 3. This loader is one of three standardized types made by National Broach & Machine Co.

In this loader, automatic transmission pinions enter the feed magazine through two mating pinions above and below the entering gear. These mating pinions automatically gage the part for size, thus assuring that oversized parts which could damage the tools as well as machine are not positioned for the shaving operation.

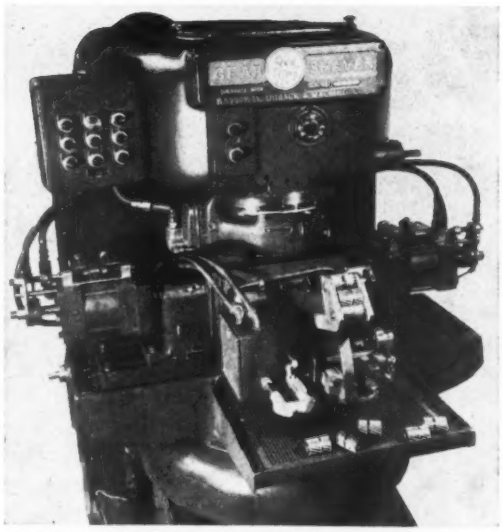
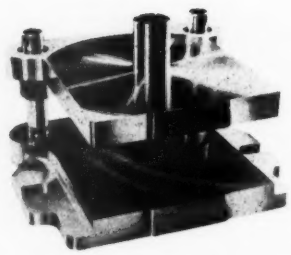


Fig. 3. A standard rotary gear shaving machine equipped with a Red Ring slide-type automatic loader.

An air cylinder controls all functions of the loader which delivers pinions to the cutter in an oriented position that permits the pinion to mesh with the shaving cutter. One section of the split-tooth pinion is shaved in the machine shown. The other section is shaved on a similar loader-equipped rotary gear shaving machine.

Automatic loaders are being successfully installed on many standard rotary gear shaving machines today. In Figure 4 are shown six Red Ring gear shavers on the assembly floor, all of which are being equipped with automatic loading devices to provide consistent high production rates and assure high precision shaved gears.

Fig. 4. A battery of standard rotary gear shaving machines on the assembly floor, all of which are being equipped with Red Wing automatic loaders.



Die Set Production Tooled for Precision and Speed

Successful application of mass production techniques to the precision job of die set manufacture provides a two-fold case study in the qualities that make a die set a precision tool and in the machines and processes essential to achieving these qualities.

The problem is especially difficult because die sets, unlike other mass-produced items, are not all alike. Rather, die sets must be delivered in literally thousands of different shapes and sizes.

The solution of this problem at Danly Machine Specialties, Inc., Chicago, applies high speed production methods to die sets requiring extremely high standards of precision, and at the same time varying widely in dimensions and tooling required.

Danly now operates two complete production lines devoted exclusively to die set manufacture, and which involve the application of complete new concepts of mass-production in precision work, at a speed which will meet industry's increased press tooling demands.

For example, an initial operation involves the torch cutting of four punch holders simultaneously. It is typical of the Danly high volume methods which always have precision and speed as twin goals.

This is followed by a special process for welding the shank to the plate which assures a strong union and increased dependability. Both sides of the hold-down clamping flanges are machined at once which constitutes another contribution to greater volume.

All drilling is at high speed to precision standards. Fixtures are interchangeable to accommodate the full range of standard die sets and thus save setup time.

Other high spots of the production line include special tooling to make rotary milling a fast, continuous operation; surface grinding to assure a flat, true working surface that saves shop tooling time, and final broaching that guarantees accurate sizing and parallelism of guide post and bushing holes. Inspection stages at all critical points make certain that precision standards are kept high.

Accuracy in manufacture is of course the key to interchangeability of standard sets. Branch assembly plants are kept stocked with die set parts from Danly's Chicago production lines. Thus these branch plants can deliver quickly any of thousands of combinations of parts with complete assurance that the combination will be the same in New York or Los Angeles.

Two Danly production lines devoted exclusively to die set manufacture. The operations include flame cutting, welding, drilling, milling, grinding, broaching, and inspection stations throughout.
The critical operations of surface grinding, and broaching of guidepost and bushing holes insure true flatness of working surface and parallelism of holes.

* DE VLIEG OF DETROIT
... is proud to reproduce this unsolicited advertisement by American Type Founders as it appeared in nationally circulated technical magazines.

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This machine hunts for—and finds—dead center!

This De Vlieg Jigmil is used to locate and bore the cylinder, gear-driven ink rollers, and gear bearing holes in ATF Chief frames.

Once the adjustments have been set, the Jigmil automatically positions every subsequent frame by moving its machine table or spindle head until the desired center is located to within 3-5/10,000ths of an inch. Then this 12-ton precision borer is micrometer-set so accurately that it will remove a pencil mark from a boring without cutting the metal.

Bearing holes not so accurately located on the press frame could easily throw cylinders out of parallel, cause excessive wear to precision gears, make smooth high-speed operation impossible and take years off the productive life of a press.

That's what we mean when we talk about the precision engineering that goes into an ATF Chief. You won't find more accurate borings in any press regardless of price. It's like getting Cadillac construction for Chevrolet prices.

It will pay you well, next time you're in the market for a small offset press, to ask for the full story on the precision-engineered ATF Chief. Write AMERICAN TYPE FOUNDERS, *a subsidiary of Daystrom, Inc.*, 200 Elmora Avenue, Elizabeth, New Jersey.

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A request on your company letterhead will bring a copy of our comprehensive illustrated catalog.

CIRCLE INFORM-A-GRAM KEY NO. 87

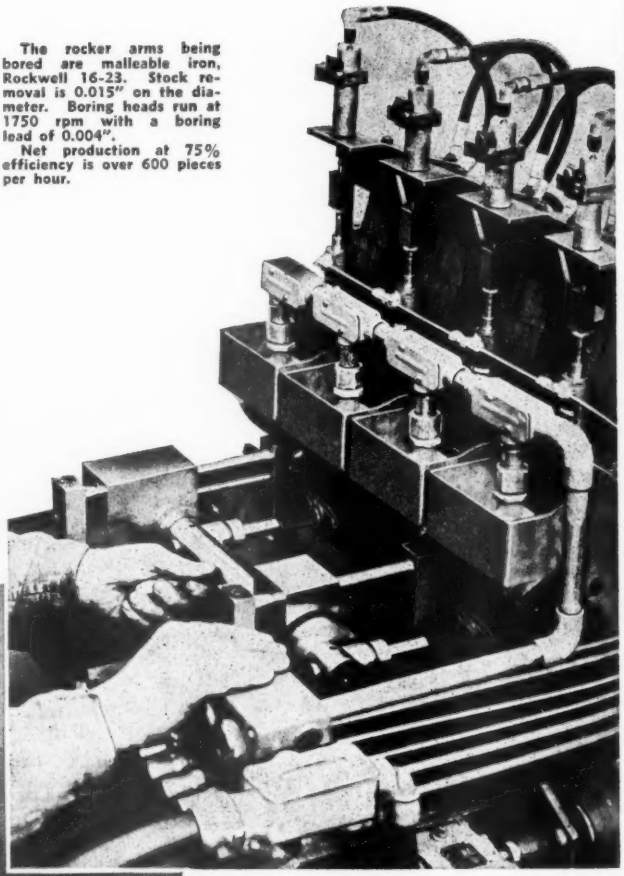
CONTINUOUS CYCLE BORING SET-UP

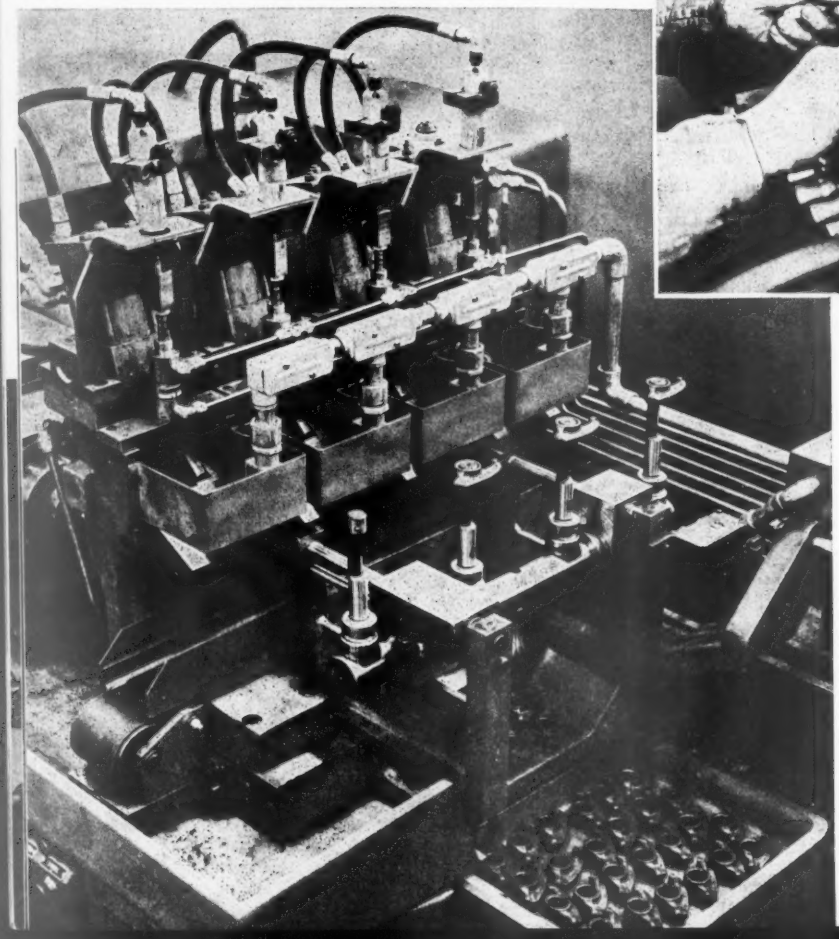
THIS BORE-MATIC MACHINE has been adapted to provide higher production through reduction of non-cutting machine time. Four individual fixtures and loading mechanisms, mounted on a fixture subbase on the machine table, allows the operator to load four stations while boring operations proceed on previously loaded parts. This eliminates extra cycle time for the loading operation.

The operational sequence is as follows: Operator fixes rocker arms on the four stake type loading arms and swings arms up into fixtures. As the fixture clamp button is actuated, an air hammer arrangement seats parts in fixtures prior to clamping. The operator retracts loading stakes from fixtures, contacting a limit switch which starts table feed. Following the boring operation, tools are automatically retracted, the table runs out at rapid traverse, and the work is automatically unclamped and ejected onto a conveyor.

The rocker arms being bored are malleable iron, Rockwell 16-23. Stock removal is 0.015" on the diameter. Boring heads run at 1750 rpm with a boring lead of 0.004".

Net production at 75% efficiency is over 600 pieces per hour.





Photos courtesy of Heald Machine Company

At left, a Model 221 Bore-Matic machine is equipped with a loading arrangement independent of fixtures holding the four rocker arms being machined. The operator positions a rocker arm on each of the four vertical stakes.

The top photo shows the loaded stakes turned 90° from vertical, ready for rocker arms to be swung into the fixtures which will hold them for machining.

The New Finger-Touch

TELE-TROL

ELECTRONIC SOLENOID CLUTCH ACTUATOR

For all types of air, electric, solenoid or manually operated machines

FASTER OPERATION

MORE PRODUCTION

LESS EFFORT GREATER SAFETY

VERSATILE IN APPLICATION

QUICK INSTALLATION PLUG-IN VARIATIONS

FASTER OPERATION—The Tele-Trol requires only finger-tip touch of both hands to single-trip the clutch mechanism...completely frees operator from fatigue and effort.

MORE PRODUCTION—A smooth, fast motion pattern is quickly developed by operators for unloading, reloading and tripping the press which materially increases output.

TWO-HAND OPERATION—Both hands must be free of the danger area before press can be tripped. Cheating is physically impossible.

ABSOLUTE SAFETY—Tele-Trol transmits a single electrical impulse to the solenoid *only when both buttons are depressed in synchronism.* Clutch cannot trip accidentally, cannot repeat without intent.

QUICK PLUG-IN CONNECTIONS—Besides operating as two-hand control plug-in connections permit the following variations: one-hand control, knee or foot-operation or remote-operation.

NO COSTLY INSTALLATION—Universal mounting requires only two holes drilled and tapped. Wiring is complete, ready to plug in.

EASY CONVERSIONS—Tele-Trol quickly converts all mechanical clutches to electrical actuation.

LOW-COST—Complete packaged unit sells for only $99.50 f.o.b. plant, Gardena, Calif. Foot-operated switches extra.

RATING: 30 amps. Unit is vibration proof, thoroughly grounded, fused, wired and ready for installation.

Recommendations for your machines gladly made.

TELE-TROL now gives you a safe, positive, simple electronic clutch control! It's especially designed for ease of application to all presses and other equipment requiring single trip or single cycle control. Applications may be made to air, electric or solenoid-operated machines.

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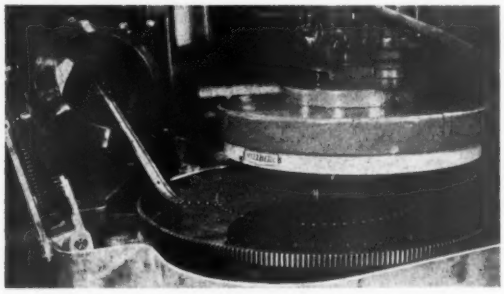
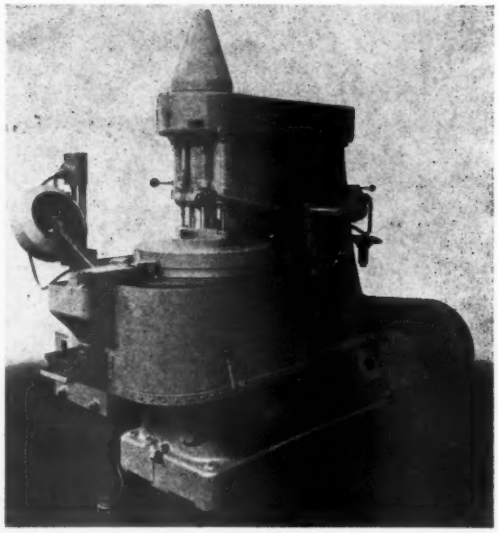
Through-Feed Lapping

HIGHER PRODUCTION RATES are now being achieved in the accurate and uniform lapping of parallel surfaces on small, flat workpieces. This is made possible by automatic loading and unloading on a standard fast-cutting machine. Lapping pressure is hydraulically powered and controlled — hence the name of the machine — Hyprolap.

The photo below shows the automatic loading arrangement with parts fed from the hopper into the continually revolving work-holder. The workpiece guide arm is shown lifted out of the way. Normally, this arm lays flat over the work-holder and is synchronized with it for proper feeding action.





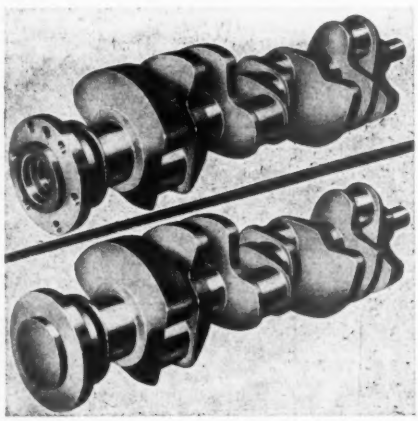
Photos courtesy of Norton Company

The automatic functioning also reduces the degree of skill required in operation. An occasional filling of the feed hopper and removal of the finished work tray are the only manual functions necessary. This through-feed arrangement reduces over-all lapping time, making possible a production as high as 8,000 pieces per hour on small parts.

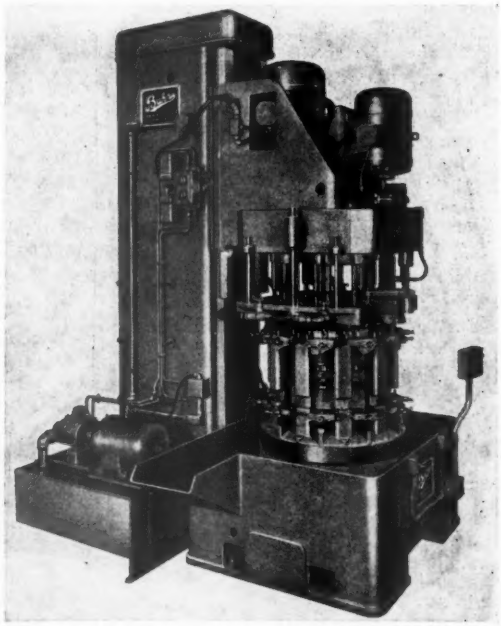
26 Operations with Single Drilling and Tapping Head

TO PROCESS 96 crankshafts per hour for a new V-8 engine, one of the leading automobile manufacturers has acquired this special Buhr multiple-spindle machine.

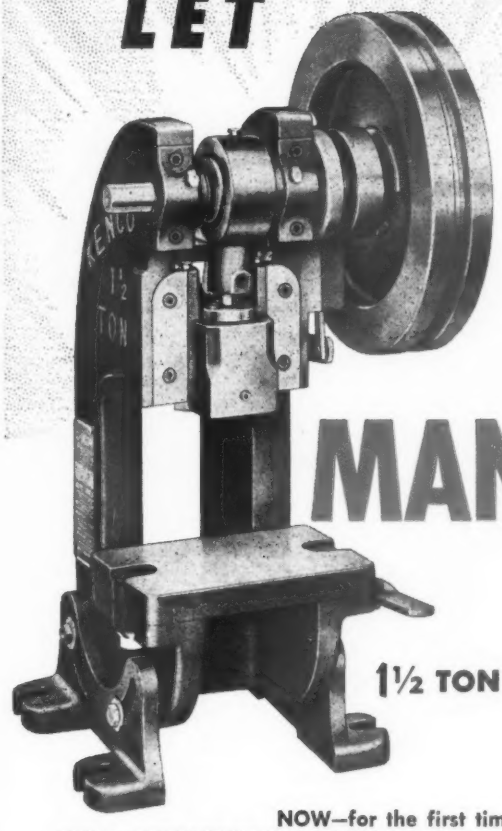
The machine consists of a 26-spindle combination drilling and tapping head, built as one unit; a 10-station holding fixture, which will permit later product-design changes; and a precision automatic index table. Operations performed on the end of the crankshaft include drilling and tapping (6) 7/16-20 holes; drilling and reaming (1) 7/16 dowel hole; plus drilling, reaming and counterboring the large center hole.



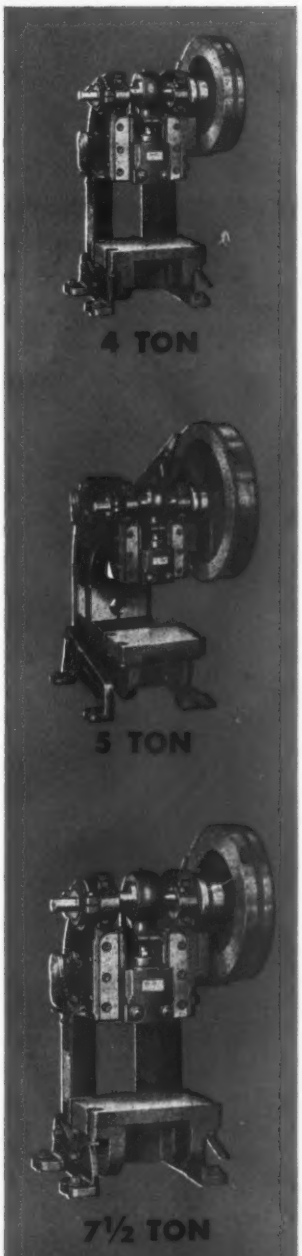
Photos courtesy of Buhr Machine Tool Co.



LET THIS NEW KENCO BABY DO A MAN'S JOB FOR YOU



1½ TON



NOW—for the first time—you can get a PRECISION BUILT, SCIENTIFICALLY DESIGNED, 1½ ton bench model punch press. This new Kenco baby is made with all the exclusive and ever popular features incorporated in the famous Kenco line of 4, 5 and 7½ ton presses . . . For example:

- One piece crankshaft built from heat treated precision ground alloy steel —
- Hardened, precision ground, V-type, double length ram guides —
- Solid crankshaft — no hazardous slots —
- Driving mechanism contained in clutch collar —
- Sturdy, extra wide, open back, inclinable frame.

WHY USE A SLEDGE HAMMER TO DRIVE A TACK? This Kenco baby will save you capital investment, overhead and downtime. You'll find it ideal for any type of precision punch press work within a capacity far above its rating.

FREE CATALOG . . . Write today for your copy describing the Kenco Models 1½, 4, 5 and 7½ ton Punch Presses, including Models 4A and 5A, deep throat, 4-in-1 presses.

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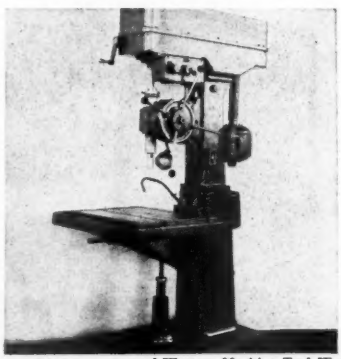
CIRCLE INFORM-A-GRAM KEY NO. 91

FEED-SPEED RELATIONSHIP CRITICAL TO MAXIMUM PRODUCTION

Too little attention has been given in the past to the provision of a sufficiently large combination of feeds and speeds, on certain types of machine tools, to assure maximum production.

Non-machining or downtime generally forms the larger proportion of total production time, which regulates the final unit cost. As recently stated by R. Parkes, assistant chief engineer of Western Machine Tool Works, "Non-machining time should be attacked with every possible device, depending on the economics of the particular job. Jigs, fixtures, single purpose tools, and even full automation should be considered wherever the job requirements warrant the tooling expenditure. Obviously every manufacturing job must be evaluated against all the factors involved, in order to set up the most profitable technique."

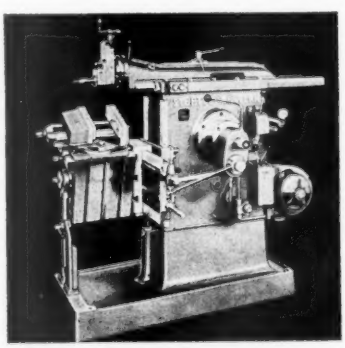
A vast amount of present-day production is nevertheless done on a short-run basis, particularly so in machine tool shops, with radical differences in materials and sizes and finishes from lot to lot. Herein lies the value of the versatile machine tool, as typified in their respective fields by the medium-duty Steptoe-Western high speed shaper and the medium-duty Western upright drill.



Photos courtesy of Western Machine Tool Works

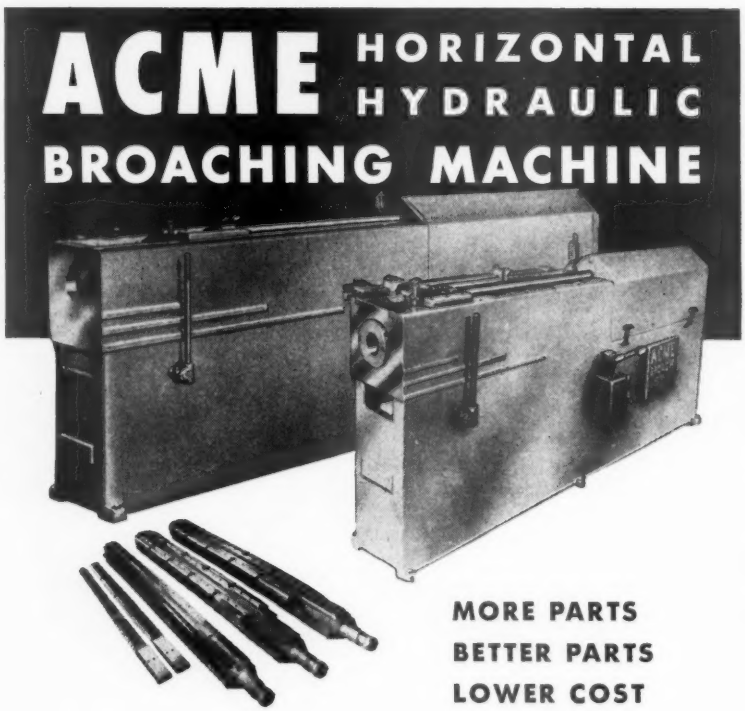
The No. 2-12 upright drill with infinitely variable spindle speeds from 190 to 2200 rpm, and selection of 9 automatic feeds from .005 to .018 ipr.

Each of these machine tools offer a wide range of feed and speed combinations, instantly available, that increase the practical application of the machine and greatly reduce the non-productive time often believed to be inherent in short-run works. Rigidity and stamina, within rated capacity, is not sacrificed for this versatility.



The 15" high speed all-geared shaper, with universal table, offers 18 speeds up to 200 strokes per minute with selection of 8 automatic feeds from .006" to .053" in either direction.

ACME HORIZONTAL HYDRAULIC BROACHING MACHINE



MORE PARTS
BETTER PARTS
LOWER COST

ACME Horizontal Hydraulic Broaching Machines are designed and built to withstand the rigors of continuous production and at the same time give the utmost in uniformly precise parts. Such results are made possible, largely, by the use of entirely new design principles offered only on Acme Broaching Machines.

These machines may easily be set up for a wide variety of internal, keyway and surface broaching jobs.

Investigate TODAY the savings you can make by putting an Acme Horizontal Broaching Machine to work in your plant. Mail us part prints and complete information on your jobs for expert advice. There is no obligation.

Write for Bulletin H-48.

ACME BROACH CORP.
MILAN, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 92

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Lower costs?

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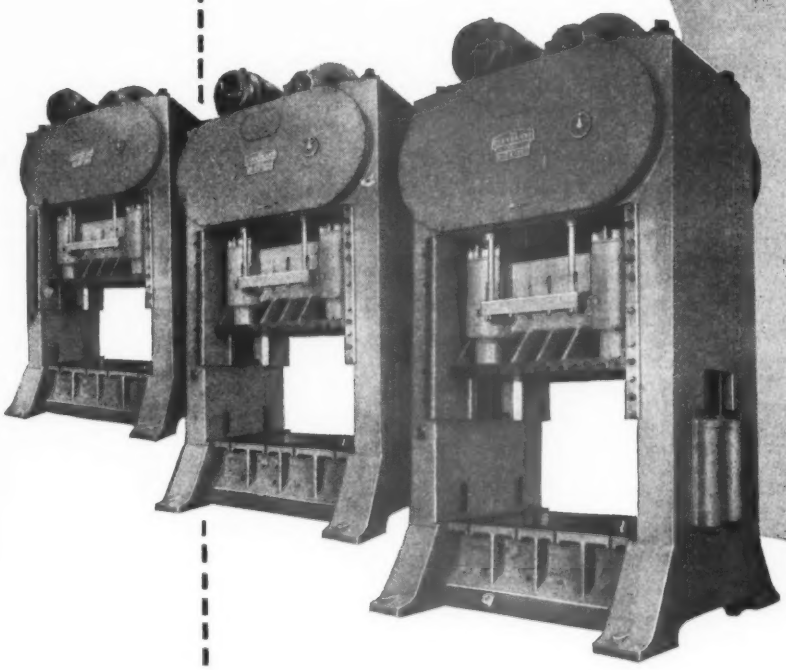

You can easily select the exact type and size press for top efficiency on any stamping job from Cleveland's complete line.

The trouble-free Cleveland Drum Type Clutch gives you positive, instantaneous slide control. Its greater accuracy means fewer rejects. Lightweight and easy to maintain, it cuts press operating costs.

Make your new presses Clevelands. A Cleveland engineer will gladly help you choose the right model Clevelands for economical press production.

Cleveland 4 Point Presses equipped with Cleveland (Patented) Drum Type Clutch

Stroke of slide	18"
Adjustment slide	12"
Shut height	54"
Bed and slide area	60x84"
Capacity	450 tons

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

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CIRCLE INFORM-A-GRAM KEY NO. 93

NEW DEVELOPMENTS IN HYDRAULICS FOR MACHINE TOOLS MEAN LOWER COST, EFFICIENT TOOL OPERATION

by W. C. Denison
President
DENISON ENGINEERING COMPANY
Columbus, Ohio

IT WAS INEVITABLE that economic pressure for greater production at lower cost would result in demand for machines and tools that could function automatically and that would require minimum manual control and attendance.

Presently, many machines are actuated by intricate mechanisms —gear trains, cams and levers— which become more and more complex as demands are made for additional automatic, low cost operations.

This complexity has led, and will continue to lead, to the increased use of hydraulics—long employed in the operation of presses—to application on all manner of machine tools.

Advances in design and manufacture of hydraulic components and circuits are making available to the machine tool builder, designer, plant engineer, and tool engineer more accurate control and operation of automatic equipment than was formerly possible with older, ordinary means.

For example, Denison Engineering offers equipment designers and manufacturers complete use of extensive technical facilities and trained hydraulic engineers to cooperate on developing tools that produce high quality products through rapid, low cost operation.

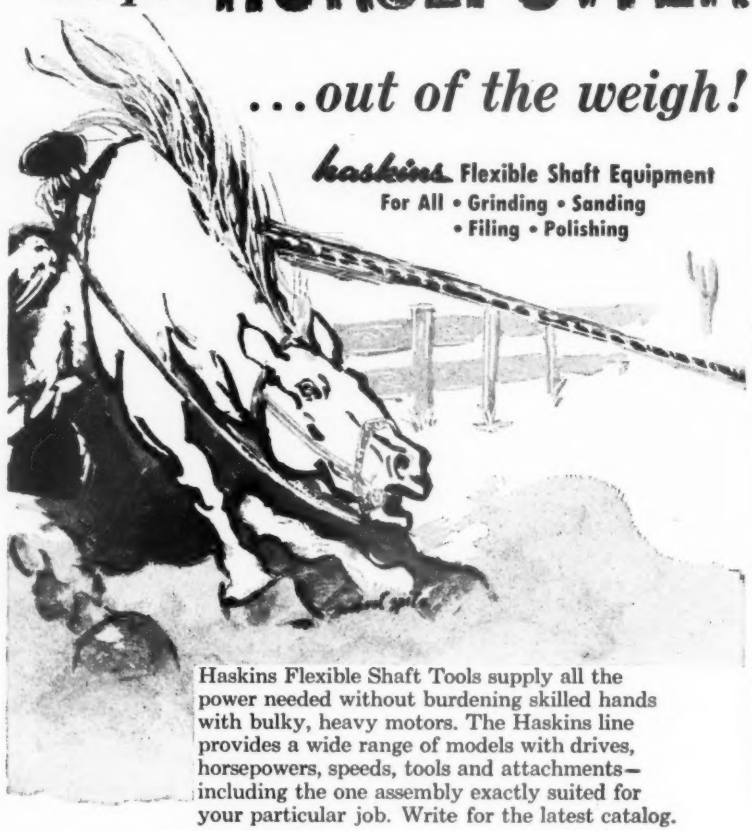
Denison's Research and Experimental Testing Department is still another way by which the company strives to bring the machine tool manufacturer the latest and finest equipment.

From the design boards in this department have come such items as the complete line of 5000 psi axial piston pumps and controls, 2000 psi vane pumps and motors, the Denison Multipress, and Multipress controls including the vibratory and servo controls.

Widespread use of these products and of hydraulic operation in general is today on the increase. This is because fluid power offers the machine tool builder and user many advantages such as complex control with relatively simple mechanism; infinite variety of cutting speeds which are accurately controlled and changeable during operation; rapid tool approach with slow cutting speed; rapid return of tool at the end of the working stroke; smooth, vibrationless action that is little affected by load variations; cushioning effect on tools which often results in an improvement of surface finish; great pressure where needed, either with or without motion; automatic release at

. . . Continued on page 169

ample HORSEPOWER
...out of the weigh!
haskins Flexible Shaft Equipment
For All • Grinding • Sanding
• Filing • Polishing



Haskins Flexible Shaft Tools supply all the power needed without burdening skilled hands with bulky, heavy motors. The Haskins line provides a wide range of models with drives, horsepowers, speeds, tools and attachments—including the one assembly exactly suited for your particular job. Write for the latest catalog.

haskins
605 S. WASHTENAW - CHICAGO 12, ILL.
CIRCLE INFORM-A-GRAM KEY NO. 94

"customer conscious..."

You are treated like a customer when you deal with The Bunting Brass & Bronze Company. It is a tradition in the Bunting organization to consider the good will of the customer as the most important factor in the transaction. Bunting customers find that Bunting resourcefulness no less than Bunting products, is made available when needed . . . Ask any Bunting customer.

The sleeve bearing is not complex in structure; it conforms readily to design requirements; it is easily installed. Cast Bearing Bronze is the most adaptable of all sleeve bearing materials; it possesses excellent anti-friction properties. With proper film lubrication, its coefficient of friction is as low as can be obtained with any other bearing type. A successful Bunting Bronze bearing installation is readily attainable. We ask the opportunity to work with you, and to quote on your requirements.

Bunting®

BRONZE BEARINGS • PRECISION BRONZE BARS • BUSHINGS

THE BUNTING BRASS & BRONZE COMPANY • TOLEDO 1, OHIO • BRANCHES IN PRINCIPAL CITIES

CIRCLE INFORM-A-GRAM KEY NO. 95

TWIN WHEEL TOOL GRINDER HAS TWIN COST-CUTTING FEATURES

More than 1,000 Twin Wheel tool grinders designed primarily for efficiently grinding carbide tipped tools have been delivered by The Standard Electrical Tool Co. since the machine tools were put on the market in 1950.

Rightfully proud of this grinder, Standard Electrical points out the fact that before the tool was unveiled four years ago, carbide tool grinders were only available with a wheel on each end of a common shaft. This made it necessary for an operator, after completing the roughing operation, to walk completely around the machine to the semi-finishing or finishing wheel — stop the machine and reverse the rotation.

"In solving this problem by positioning both wheels at the front of the machine," says R. A. Huhn of Standard Electrical, "we also delivered an innovation to the extent that our grinder is the only 'two-man' machine on the market. When in operation, both wheels are rotating in the same direction; therefore, if two operators are working on the same machine, both have the desired rotation."

In positioning both operators in front of the machine, the twin grinder delivers another economy in minimum use of floor space. The machine can be placed against the wall (or in a corner) as only one side of the machine is essential — access to all parts is available from the front of the machine.

Also, the longevity of the cutting tool is partially predetermined by minimizing the heat

generated during the grinding operation by assuring generous supply of coolant. The design of the twin-grinder incorporates a complete spray and splash control that eliminates the tendency of the operator to use less than the desired amount of coolant.

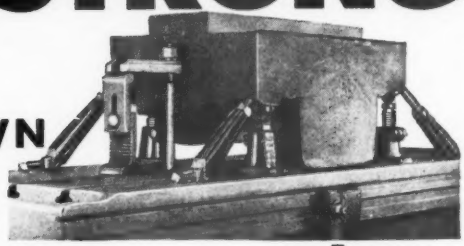
Here is another cost cutting feature:

On some grinders still in use, the table does not allow for adjustment after the wheel has been worn to approximately 3/4" height. The wheel must then be discarded. The Twin Wheel tool grinder, however, is designed so that the wheel can be worn all the way down to the metal backing plate.

Another advantage is the guards, which have built-in coolant arrangements, permitting the changing of a wheel in five minutes as compared to approximately 20 minutes on some other grinders. If 20 wheels are used per month, or 240 per year with a savings of 15 minutes for changing each wheel, a total of 60 man-hours per year is saved.

ARMSTRONG

SET-UP and HOLD-DOWN TOOLS



PLANER JACKS

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents.

T-SLOT CLAMP

NON-SKID JACKS

Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

Write for Circular

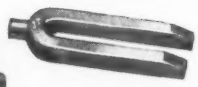
STEP BLOCK

ARMSTRONG BROS. TOOL CO.

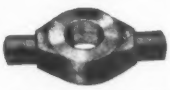
"The Tool Holder People"

5220 W. Armstrong Ave., Chicago 30, U. S. A.

UNIVERSAL CLAMP



T-SLOT BOLTS AND NUTS



STRAP CLAMPS

SEE US AT BOOTH 232, ASTE SHOW, PHILADELPHIA

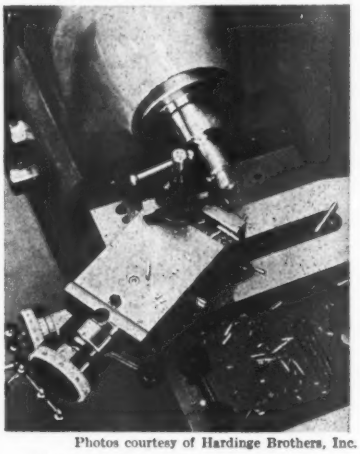
CIRCLE INFORM-A-GRAM-KEY NO. 96

GREATER ACCURACY PROVIDED BY VARIABLE ELECTRIC FEED

New literature presenting the same old design will not effectively enthuse anybody in Industry. It takes a machine of entirely new design to create interest, attention, and results which cause replacement of older, obsolete models. Construction improvements, operational features, better controls, higher speeds and greater accuracy have been combined into the modern Hardinge HLV high speed precision lathe for toolroom, laboratory and development departments.

Speaking of better controls, the HLV has:

1. Separate variable spindle speed control.
2. Independent variable electric feed for carriage and cross slide.
3. Gear box and lead screw for threading only.
4. Instantaneous forward, stop, or reverse of carriage travel (hand and automatic).



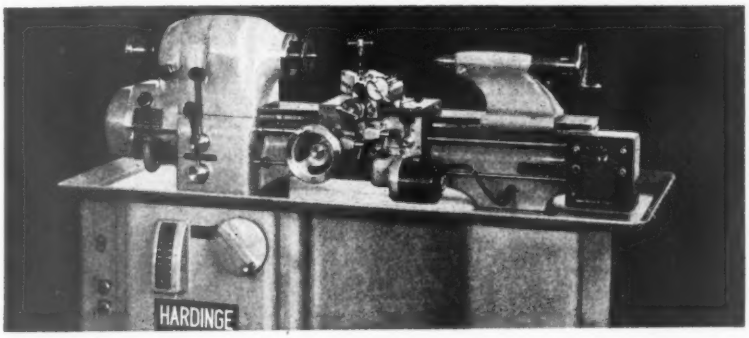
Photos courtesy of Hardinge Brothers, Inc.

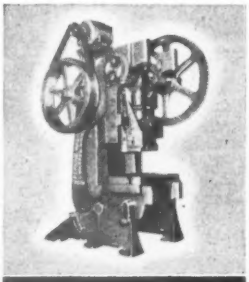
View showing the automatic carriage control stopping threading cut at shoulder.

The separate variable spindle speed and separate electric carriage drive permit speed selections under power for best results in chip removal and work finish.

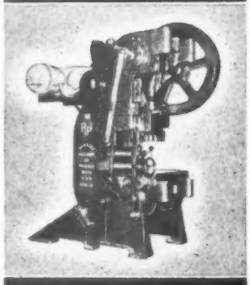
The hardened and ground steel dovetail bed and the solid full bearing carriage constitute proper support for carbide cutting tools and absolute rigidity.

Modern in design and appearance in all respects, right down to the easy reading black and white dials, this machine makes modernization a must by obsoleting older and larger equipment.

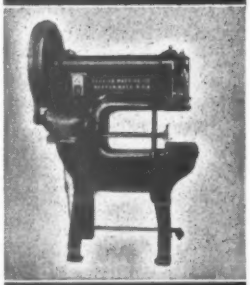




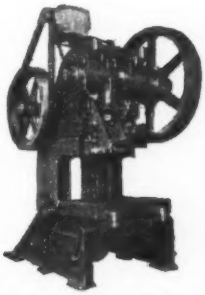
#700 B GEAR PRESS



650-B PLAIN FLY WHEEL

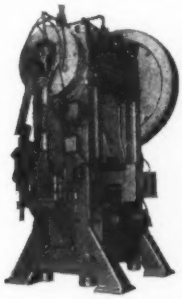


No. 10M FLYWHEEL PRESS



No. 800B GEARED INCLINABLE PRESS

Illustrating a few of the many types and sizes of standard Perkins Presses. Presses built to customers' special specifications.



No. 12-H-36 STRAIGHT SIDE, SINGLE CRANK TIE-ROD CONSTRUCTION PRESS CAPACITY 200 TONS

Perkins Power Presses SINCE 1885

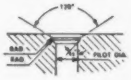
PERKINS MACHINE CO.
WARREN, MASSACHUSETTS

CIRCLE INFORM-A-GRAM KEY NO. 97

NOW!
PRODUCE
A.N.D. 10050
PORT CONTOURS
3 TIMES FASTER!

The new Sonnet Port Contour Cutter completes all five operations in one pass!

Chamfering, counterboring, radiusing, countersinking, spot facing... all five are necessary to produce the A.N.D. 10050 port contour or connecting hole. Now, with Sonnet's new four-fluted, special-purpose contour cutter, all five operations can be completed with a single pass, *reducing job time as much as two-thirds!*



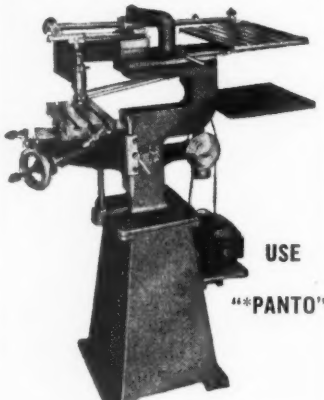
The new cutter is made from alloy steel and hardened for toughness. Carbide tips on all four flutes assure longer cutting life and smoother finish. Available in all sizes with integral or replaceable pilots.

Write for descriptive literature and prices today

Sonnet
TOOL AND MFG. CO.
576 No. Prairie Avenue, Hawthorne, California
Specialists in carbide and high speed steel cutting tools

CIRCLE INFORM-A-GRAM KEY NO. 98A

for fast . . .
accurate . . .
engraving . . .



USE
"*PANTO"

Pictured above is the PREIS-*PANTO Model 2D-4 Precision Engraving Machine for use on large metal or plastic panels, signs and name plates; steel stamps and dies or any product requiring precision engraving.

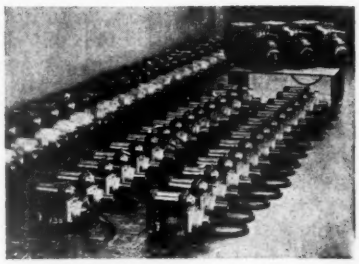
Write for 2D-4 Bulletin and prices

PANTO
Trade Mark
*Reg. U. S. Pat. Off.

H. P. PREIS ENGRAVING MACHINE CO.
647 U. S. Route 22, Hillside, N. J.

CIRCLE INFORM-A-GRAM KEY NO. 98B

AIR-HYDRAULIC DRILL UNITS OFFER WAY TO EFFECTIVE AUTOMATION AT LOW COST



WITH THE TREND toward plant automation assuming new urgency due to continued rising production costs and sharper competition, packaged precision power units for drilling, tapping, reaming and related operations are offering an important new way for manufacturers to build their own low-cost fully automatic single-purpose machinery.

by Lyman K. Shepard
Sales Manager
Drill Unit Division
ROCKWELL MANUFACTURING CO.
Pittsburgh, Pennsylvania

Other important advantages of this "building block" method of assembling semi and fully automatic machining setups are, of course, time and cost savings in machine design and construction, increased versatility and easier, quicker change-over.

The world's first complete line of mass-produced air-hydraulic drill units began rolling off Rockwell assembly lines in quantity during 1953, thus enabling manufacturers desiring single-purpose drilling and tapping setups to order units right from the shelf and build their own relatively inexpensive mounting facilities to accommodate them.

Because of the completely automatic feature of these units, one operator located at a central control station can maintain control of an entire battery of high speed operations in a single machine — a machine, that is, which includes automatic indexing and work-holding fixtures.

Shop-designed machines incorporating these units also offer exceptional versatility. They can be quickly and easily adjusted to perform the same operations on a different part size — or can be changed over very readily to completely different operations.

Sealed unit construction enables them to be mounted at any angle, thus facilitating simultaneous drilling of vertical, horizontal and angular holes. Additional time and cost savings are made possible by the fact that these units permit bringing the tool into the work instead of the work to the tool — thus making all sorts of special cost-saving tooling wrinkles possible. This is of particular importance on such operations as milling and boring.

Built-in limit switches, which require no adjustment, provide the basic electrical elements for full electrical remote control, simplifying electrical interlocking of the units with index tables on automatic work-holding devices.

Until recently these Rockwell units have all been operated on shop-supplied air pressure with feed, rapid approach and rapid return stroke of the spindle being accurately controlled by the unit's self-contained hydraulic system.

At the ASTE show in Philadelphia in April, however, Rockwell will publicly show for the first time how these units can be operated entirely with hydraulic fluid — an operational feature developed over the past few months and applied to standard units superficially modified for the purpose.

All-hydraulic operation — though it is not preferred by most manufacturers, we believe — does offer one additional advantage: greater thrust capacity. The thrust of the largest of our three standard units, for example, is increased from 1,800 lbs when operated on air to 6,500 lbs on an oil circuit at 300 psi oil pressure.

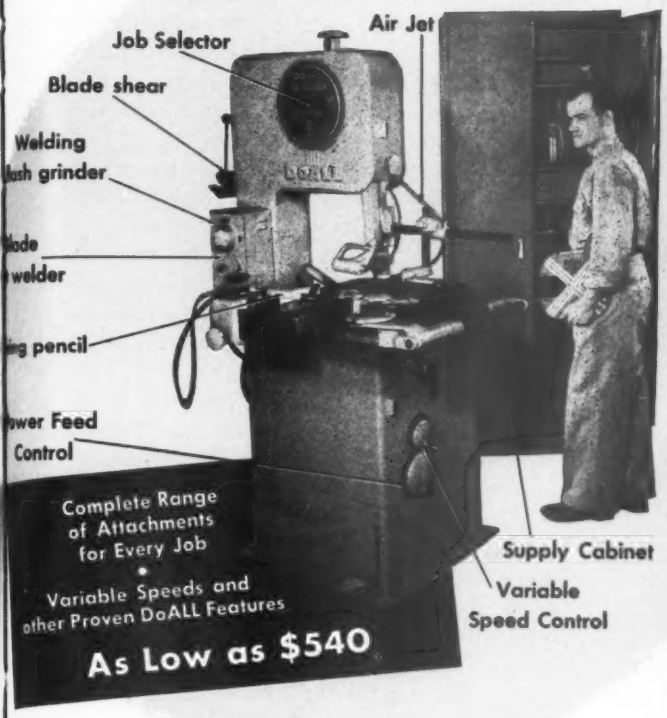
More important, however, are some of the key accessories which we plan to introduce formally in the near future.

These include:

1. Overhead motor-mounted belt drive arrangements for conversion of fixed spindle speed units to flexible speed units by using pulleys and belts.

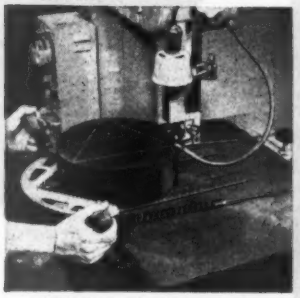
. . . *Continued on page 168*

DoALL *Announces* A NEW LOW COST 16" CONTOUR MACHINE



NEW carbide tool finishing attachment with abrasive bands!

TILTING table plus mitering attachment produces compound angles.



HEAVY work slide attachment with power feed reduces fatigue, speeds work.

CUT-OFF and mitering attachment provides precision accuracy, speed.

RATCHET feed and work-holding jaw for ease and speed.

DISC cutting attachment produces perfect circles fast and easily.

RIP fence makes fast, precision cutting a simple job.

FILING—internal or external with DoALL file bands.

Now Any Plant Can Afford The Advantages of a DoALL!

HERE IS the greatest value ever offered in a 16" x 12" capacity multi-purpose contour saw: for toolroom and light production work . . . automatic power feed . . . fixed and variable speeds of 50 to 5200 blade feet per minute . . . for sawing, friction sawing, filing, polishing, carbide tool finishing.

There are five models, starting at $540 (less motor, starter and attachments). *You save money* because you do not have to buy more machine than is needed for the job. *You get more for your money* because these machines have DoALL quality and DoALL versatility through and through.

And, never before have machines in this size and price class been available with such a great variety of attachments. There is no class of work within their range which cannot be handled faster and at lower cost with these new DoALL's.

Ask for a demonstration in your own plant. Call your local DoALL Service-Store, or write:

The DoALL Company, Des Plaines, Ill.

DoALL

3-20

Call DoALL See classified phone directory for DoALL Store nearest you.

Machine Tools . . . Cutting Tools . . . Gages . . . Supplies

See this New DoALL in Operation at The ASTE Show
Philadelphia—April 26-30
Booth No. 1503

ONE JIB serves FOUR MACHINES

Rugged BUSHMAN Jib Cranes of Welded Steel Construction, with Many Modern Design Features—Rotate 360 Degrees—Easily on Anti-Friction Bearings. All types available in capacities of 500 to 10,000 Lbs.

Manufacturers of —
- Jib Cranes
- Portable Gantry Cranes
- Grabs

Exclusively

BUSHMAN

MATERIALS HANDLING EQUIPMENT
H. L. BUSHMAN CO.
5729 WEST LAKE ST Dept. T CHICAGO 44, ILL., U.S.A.

Send for Bulletin C-102

CIRCLE INFORM-A-GRAM KEY NO. 100A

TO SPARK PRODUCTION

Model "D"

BORING
TURNING
FACING
GROOVING
UNDERCUTTING

ALL IN 1 TOOL-HEAD

A Boring Head that Won't Face is Not Complete

Write Today for Complete Details

CHANDLER TOOL COMPANY
MUNCIE, INDIANA

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

CIRCLE INFORM-A-GRAM KEY NO. 100B

. . . Obsolescence, from page 69

replacement purchases to top executives of the company, who must consider the problem from the standpoint of savings, capital expenditures, taxes, and depreciation allowances.

To each replacement suggestion is attached a recommendation as to the new machine to replace the old, and details showing direct labor savings effected by the new machine, the indirect benefits to be gained, and an estimate as to how long it will take for the new machine to pay for itself.

This gives the executives reviewing the situation a factual basis on which to make decisions.

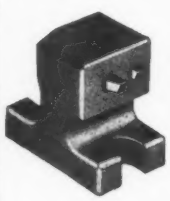
The result is a continuing program of replacement and modernization based upon knowledge of the performance of each individual machine.

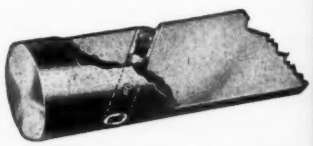
I sometimes hear the question asked as to whether machine tool companies take their own medicine. I can assure you that at Warner & Swasey we do. In our replacement policies and procedures, we are following the course of action we urge our customers to follow. We suggest the method of the "five flags," above described, as a practical means of setting up and maintaining a continuous program of replacement and modernization.

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

Patents Pending

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.





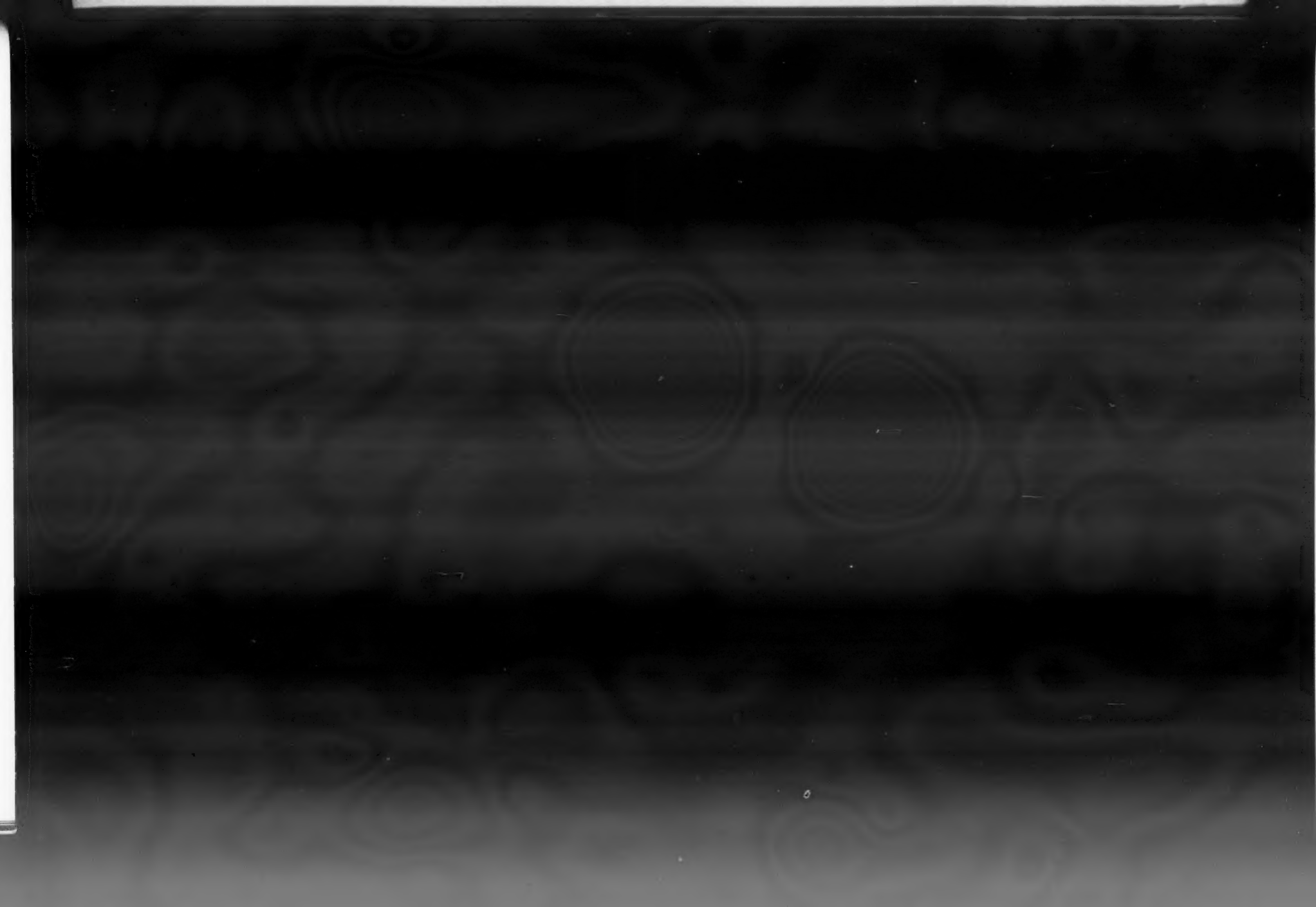
The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES:
3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 1"

STURDY BROACHING SERVICE
23516 TELEGRAPH RD., DETROIT 19, MICH.

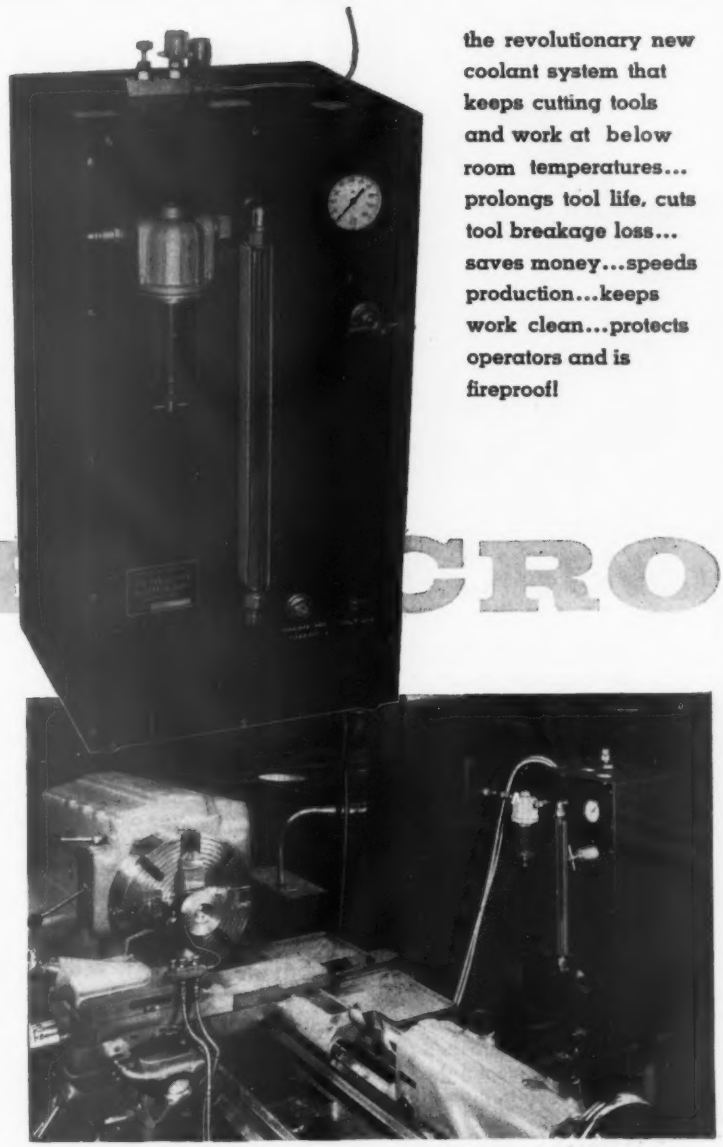
Write for Literature

CIRCLE INFORM-A-GRAM KEY NO. 100C



LO-JET ACRO

Now! the new improved mist cooling system!



the revolutionary new coolant system that keeps cutting tools and work at below room temperatures... prolongs tool life, cuts tool breakage loss... saves money...speeds production...keeps work clean...protects operators and is fireproof!

LO-JET ACRO

More efficient and adaptable—with separately controlled multiple spray heads. One nozzle can produce a true fog spray while another gives a liquid stream.

Easier to regulate—master panel control now makes every adjustment simpler, much more accurate. Spraymix control, attached by flexible tubes to top of unit, makes for easy positioning and precise, constant spray control.

More compact—all controls, regulators, gauges are **in one place,** at the operator's fingertips.

Smarter looking—a single neat, green wrinkle-finish case houses all mechanisms and controls. The new design eliminates excess piping.

Portable or stationary—mounting permits 'round-the-plant portability, and sturdy bracket mounting also provides for permanent one-location use. Both mountings come with unit.

LO-JET ACRO

there's a Lo-Jet Acro system for every purpose, every machine— write now for details!

AIR CONVERSION RESEARCH CORPORATION
4107 NORTH DAMEN AVENUE
CHICAGO 18, ILLINOIS

SEE THE NEW LO-JET AT THE A.S.T.E. SHOW—DEMONSTRATIONS AT BOOTH 1251

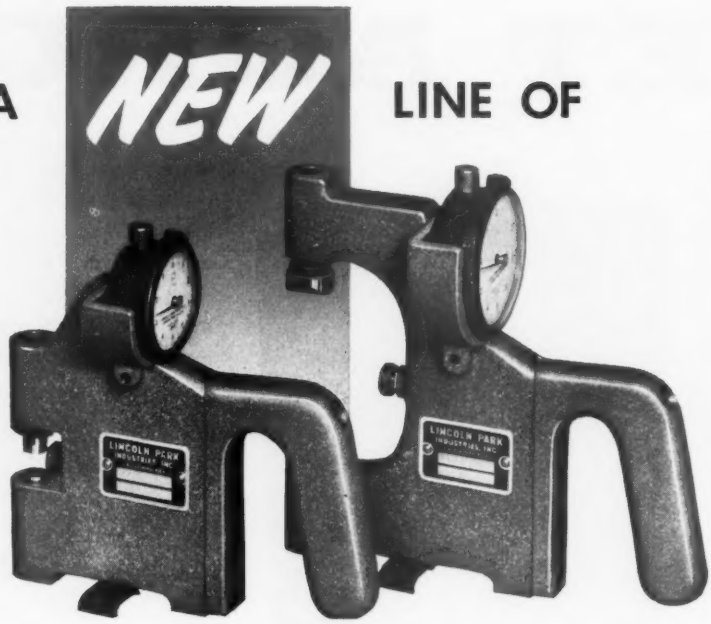
Air Conversion Research Corporation TP-4
4107 N. Damen Avenue, Chicago 18, Ill.

Gentlemen: Please send me full information about the new Lo-Jet Acro mist cooling system.

name and title_____
firm_____
address_____
city and zone_____ state_____

CIRCLE INFORM-A-GRAM KEY No. 101

A NEW LINE OF



DIAL SNAP GAGES

Again, Lincoln Park Industries steps forward with a new development in snap gages that means further help to your production. Note these real advantages:

SIMPLIFIED DESIGN AND CONSTRUCTION—Lincoln Park Dial Snap Gages are designed to give a direct reading from the measuring anvil to indicator. There are no bearings, levers or cams to get out of adjustment.

PRECISION ADJUSTMENTS—By means of its fine pitch ground thread screw attachment, the upper anvil can be adjusted within a ¼" range.

WEAR-RESISTANT ANVILS—The parallel anvils are supplied either carbide tipped or Carb-O-Plated.

SHOCKPROOF—Even when Lincoln Park Dial Snap Gages are used by inexperienced operators, there is no possibility of damage by accidental shock. The indicators themselves are encased in a housing to protect them from damage.

CHOICE OF INDICATORS—Any A.G.D. size indicator can be used.

LONG LIFE—Because these gages have a minimum of parts to wear or be replaced, maintenance is negligible and long, trouble-free operation is assured.

Send for our new Bulletin giving sizes and other information.

THE PLUS IN PRECISION

Lincoln Park INDUSTRIES, INC.

1719 FERRIS AVENUE, LINCOLN PARK 25, MICH.

DESIGNERS AND MANUFACTURERS OF: SPECIAL AND STANDARD CARBIDE CHROME PLATED AND STEEL GAGES CARBIDE ROTARY FILES • ALSO FACILITIES AND SKILLED PERSONNEL AVAILABLE FOR PRECISION PARTS PRODUCTION.

CIRCLE INFORM-A-GRAM KEY NO. 102

Low Cost Stampings Produced by New Inverted Press

A new line of inverted vertical hydraulic presses adaptable to a wide variety of stamping and extrusion operations has just been announced by a Detroit manufacturer.

These new presses have their hydraulic control cylinder in the base of the machine, a unique design feature that reduces overall height, avoids shut height limitation, lowers center of gravity and provides areas at the top and sides for the mounting of auxiliary hydraulic cylinders.

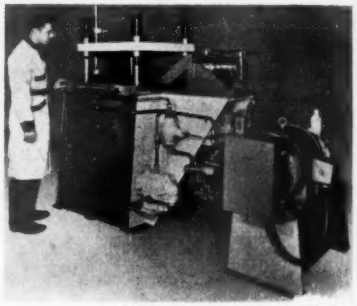


Photo courtesy Walter P. Hill, Inc.

This new 175-ton inverted hydraulic press performs bending and extrusion operations on ferrous and non-ferrous parts, as well as upsetting, drawing and coining operations that would require special auxiliary equipment on standard presses. The hydraulic power pack unit providing press operating pressures is at the right of the machine.

Hill inverted presses are ideally adapted to bending and extrusion operations on ferrous and non-ferrous parts as well as upsetting, drawing and coining operations that would require special auxiliary equipment on standard presses. Stampings requiring deep draws and additional auxiliary operations can be simply produced on these presses. Multiple operations such as piercing or forming can be performed during the deep drawing or extrusion operations on these presses.

Die capacity of the presses can be easily increased by providing long guide rods. Large press bed areas avoid the necessity of installing auxiliary die guide equipment to obtain perfect die register.

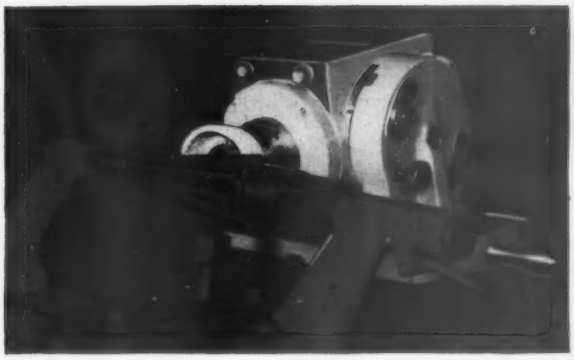
Machine Description

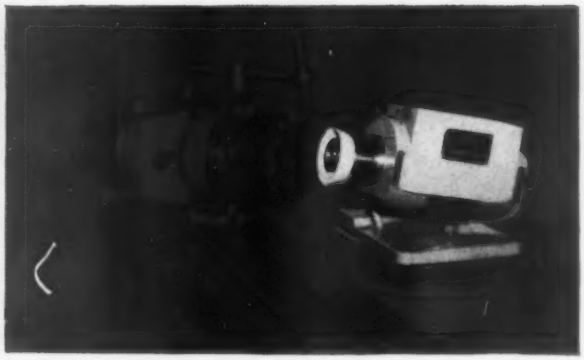
The base of the presses is welded steel construction. A hydraulic cylinder, operating on 5,000

. . . *Continued on page 130*

Specify THIS NEW POPE SUPER PRECISION
1 HP, 3600 RPM MOTORIZED TOOL AND CUTTER GRINDER
CLEARANCE ANGLE SWIVELLING HEAD

With Angular Adjustment In A Vertical Plane





TIME AND MONEY SAVING FEATURES:

1. **Cup wheels, generally considered best for cutter grinding, can be used for practically all clearance angles on this new head.**
2. **Cup wheels produce a cutting edge on tools that lasts longer because it is stronger.**
3. **The tooth rest remains on the center line of the cutter for practically all grinding on centers or in the work head.**
4. **Most cutters and reamers can be ground all over with one set-up, using the swivelling table and Pope tilting head. The usual second and third set-ups are no longer required.**
5. **All clearance angles read directly in degrees from the scale provided on the head. Mistakes on clearance angles are avoided.**
6. **The right clearance angle is assured on tools difficult to grind, such as slab mills, taper reamers, angular cutters and form tools.**
7. **3600 R.P.M. — one wheel speed — safe for all wheels generally used on cutter grinders. Heat checking of cutters is virtually eliminated.**
8. **The operating ease and convenience of this new Pope Head with the angular adjustment in the vertical plane saves you time and money on every tool you grind.**

ASK FOR COMPLETE SPECIFICATIONS

No. 96

Specify **POPE** PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET • HAVERHILL, MASSACHUSETTS

CIRCLE INFORM-A-GRAM KEY No. 103

ONLY DIEBEL PRESSES HAVE THE EXCLUSIVE

CYLINDRICAL RAM

STOPS ABNORMAL DIE DULLING

Misalignment of punch and die because of inadequate gibbing is the major cause of abnormal die dulling and short die life. The V-shaped gibs on conventional presses do not offer enough guiding surface, regardless of length, to assure positive alignment in day in day out mass production.

Diebel's cylindrical ram design affords maximum guiding surface and guarantees accurate punch and die alignment.

The exclusive cylindrical ram is another proof that DIEBEL PRESSES are designed, engineered and built with the die in mind.

DIEBEL HI-PRODUCTION AUTOMATIC PRESSES

Compare the tremendous amount of precision guiding surface of the cylindrical ram with the V-shaped gibs that guide the ram on conventional presses.

DI MACHINE CORP.

2708 W. IRVING PARK ROAD • CHICAGO 18, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 104

Liquid Blasting Cuts Die Cleaning Costs

Precision cleaning of forging and casting dies at Imperial Brass Manufacturing Company, Chicago, with a Hydro-Finish liquid blast unit saves the company $22,500 per year in cleaning costs and increases die life 15 per cent.

Imperial Brass, manufacturer of a quality line of brass fittings, nozzles, valves, strainers and related products, has the constant problem of removing heat scale and carbon deposits from its dies. The company formerly used slow hand methods to remove these deposits, which are caused by forging compounds and oils.

Photos courtesy Pangborn Corp.

Fig. 1 Imperial Brass cleans 25 to 30 forging and casting dies per day in this Hydro-Finish blast machine.

It now uses a model EZ Hydro-Finish machine which speeds the cleaning operation, increases die life and puts a smoother finish on die surfaces. This liquid blast machine cleans with a stream of suspended non-metallic abrasives. Abrasives are generally in the talcum powder range and finer. Machines handle particle sizes from as coarse as 60 mesh to as fine as 5000 mesh equivalent. As a result of the speed of the process the company reports a minimum saving in cleaning time of two hours per average-size die and up to three hours for large and more complicated dies.

Imperial Brass cleans from 25 to 30 dies per day. Small dies take only 5 to 10 minutes. The largest dies take from 15 to 20

minutes. One operator spends about 5 hours per day on this job.

The company figures its production savings in this manner: Using a conservative figure of 25 dies per day, the two hours

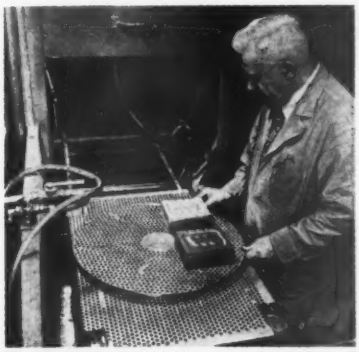


Fig. 2 These small dies are cleaned in 5 min.—a reduction of 2 hr. cleaning time per die. And, because resultant surface finish of dies is smoother than with hand cleaning methods, die life is increased a minimum of 15 per cent.

saved per die amounts to a minimum labor saving per day of 50 hours. Using the Chicago area average rate of $1.50 per hour, this amounts to a savings of $75.00 per day. On the basis of a 300 work day year, Imperial Brass figures they save a minimum of $22,500 annually.

This is a precision cleaning operation, capable of holding tolerances to as close as .0001 in. The cleaning is a polishing rather than a gouging and thus puts less wear on die surfaces.

Other advantages reported by the company include the reduction of forging troubles, better quality products, no break down of sharp edges and corners and no change of tolerances. For instance, whenever there is any tendency of forging dies to stick, Hydro-Finish is used to eliminate the trouble. Also, on die castings dies, when there is any tendency toward difficulty of removal from cavities, these dies are polished by the liquid abrasive stream. This also results in a much improved finish on the product because any imperfections on the dies are removed before the dies are reused.

After dies are cleaned, they are coated with rust proof oil and are then ready for further use with no hand polishing required. And because the Hydro-Finish method cleans more evenly and with less irregularities, these forging and casting dies can be used longer between cleaning.

FAMOUS FOR QUALITY

BARNES

Band Saws

HARD EDGE • FLEXIBLE BACK

ARC LINE
RAKER SET

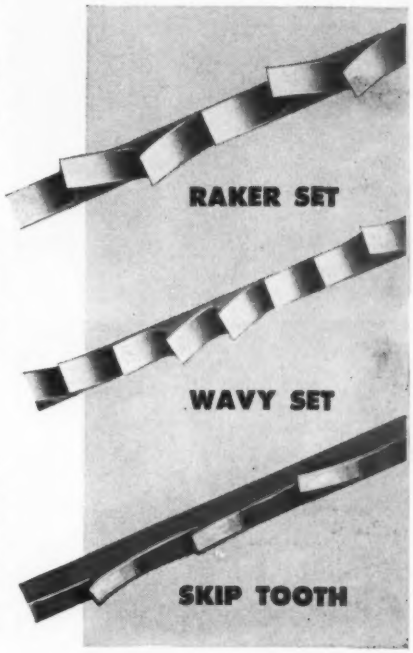
Preferred for cutting larger solids or thick plate—assures fast cutting rate. Arc Line Raker Set retains the saw kerf. For contour cutting, Arc Line Raker Set permits cutting dies and intricate shapes to a layout line within close tolerances. On cut-off operations, Arc Line Raker Set is used on large stock. It resists wear and gives longer blade life.

ARC LINE
WAVY SET

Arc Line Wavy Set eliminates stripping when cutting thin sections, such as structural shapes, tubing, pipes, sheet stock, etc. Used on all horizontal and vertical machines, such as Johnson, Kalamazoo, Wells, DoAll, Grob, Tannewitz, and others. Arc Line Wavy Set is preferred by foundries for removing gates and risers where fins are encountered.

BARNES
SKIP TOOTH

Barnes Skip Tooth is used for cutting nonferrous metals, plastics, paper, wood, rubber, etc. The special tooth design provides maximum chip clearance, cuts faster and easier. Aluminum and magnesium foundries prefer Barnes Skip Tooth. Woodworkers use it because it resists dulling due to glue and nails. No resharpening is necessary. Lasts longer. The hardened teeth retain keen cutting edge. Designed for high speed cutting.



BARNES WELDED BAND SAWS are SUPERIOR!

Barnes Welded Bands save operator time and eliminate waste blade stock. They are tailor made for specific sawing machines. Time saved increases production. Barnes assures a "perfect" weld on a superior blade. It all adds up to more cuts at less cost.

BARNES PACKAGING is DESIGNED for YOUR Convenience

Packaged 3 ways!

1. 100 ft. Coils—Easily handled. Safe, convenient to store, free from tangle. Saw is coiled to readily unwind as well as rewind. No projecting ends.
2. 250-500 ft.—Economical random length coils. Provide greater economy and minimize waste.
3. Welded Bands—Perfectly welded to desired length. Packaged 6-10-12 to carton as requested.

Call YOUR INDUSTRIAL DISTRIBUTOR

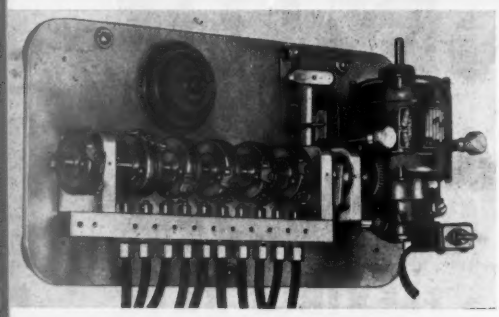
W. O. Barnes CO., INC.

FAMOUS FOR QUALITY • 1297 TERMINAL AVE., DETROIT 14, MICH. • ESTABLISHED 1919

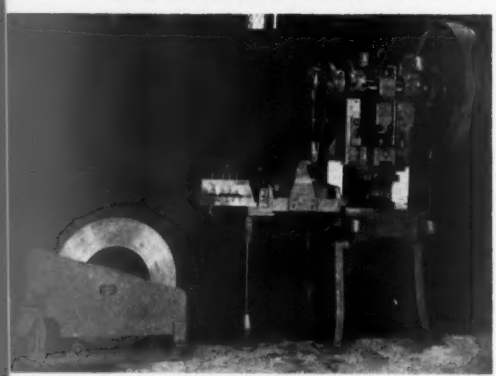
CIRCLE INFORM-A-GRAM KEY NO. 105

PROGRESS

NEW DEVELOPMENTS • IMPROVEMENTS • COST AND TIME SAVERS

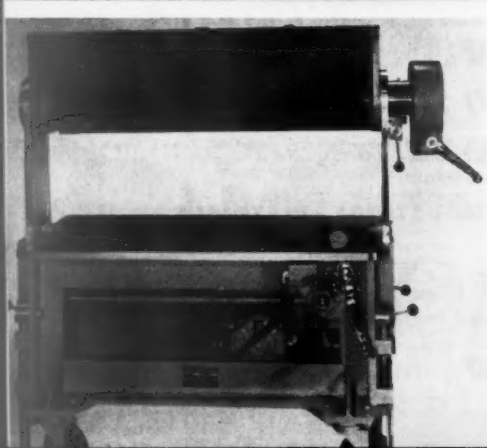


Electro - Pneumatic Timer. This machine will be shown in Booth No. 1907 by the Mead Specialties Co., Dept. S-93, 4114 N. Knox Ave., Chicago 41, Ill. Further information is offered.
Inform-A-Gram No. A1.



Slide Feed This machine can feed stock in left to right direction. Also illustrated is an automatic coil cradle equipped with a pair of hardened and ground takeout rolls. Both machines will be displayed in Booth 1254 by U. S. Tool Co., Ampere (East Orange) N. J. Literature available.
Inform-A-Gram No. A2.

Automatic Power Saw This extremely fast cutting machine for production cut-off operations will be featured in Booth 1503 by the DoAll Co., Des Plaines, Ill. DoAll also will exhibit a new line of automatic surface grinders and simplified methods for maintaining dimensional control. Literature on the products that will be displayed is available.
Inform-A-Gram No. A3.



Die Handling Equipment. The Model 1010 Hansford die handler and Model 1010-1 motorized lift attachment will be demonstrated by the Hansford Mfg. Co., in Booth 2064. This combination has never been on exhibit before. A pamphlet describing the die handler is available to TOOLING and PRODUCTION readers.
Inform-A-Gram No. A4.

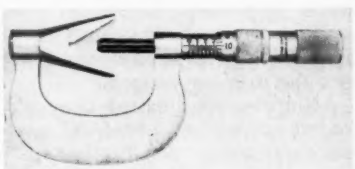
This New "Adjust-Tru" Air Chuck of 12" will be unveiled in Booth 1647. It is a wedge-type actuated chuck that will main-

tain precision within 0.001". For literature write Buck Tool Co., 2015 Schippers Lane, Kalamazoo, Mich., or—
Circle Inform-A-Gram No. A5.

A Modified Drill Unit which can be operated entirely with hydraulic fluid will be introduced by the Drill Unit Division of the Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa. Further information available.
Circle Inform-A-Gram No. A6.

Latest Applications of the New Cemented Carbide for heavy duty steel cutting, grade 370, will be demonstrated by the Carboloy Dept. of General Electric, Detroit 32, Mich., at Booth 1603. The importance of cemented carbides in today's automated setups will be stressed in the display. Complete literature on this product is available.
Circle Inform-A-Gram No. A7.

A Micrometer for Three-Fluted Tools will be displayed at Booth 328 by the Tubular Micrometer

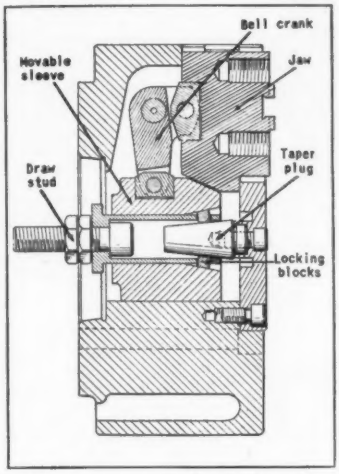


Co. of St. James, Minn. It can be used when the tool is set up in the machine. Further information is available.
Circle Inform-A-Gram No. A8.

ON PARADE

Mail FREE Inform-A-Gram Card for MORE Details.

A Power Release Only Chuck will be shown for the first time at the Tool Show by the Logansport Machine Co., Logansport, Ind., in Booth 1550. The chuck

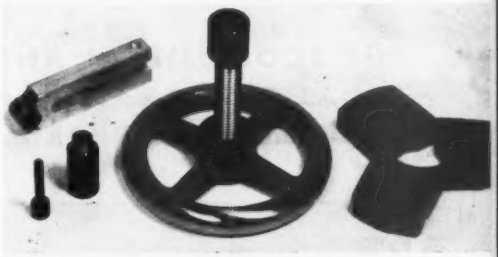


will remain locked in closed position until it is positively opened by the operator. As shown in the drawing, the holding force is produced by a set of bell cranks actuated by the axial of the draw sleeve. Write for further information.
Circle Inform-A-Gram No. A9.

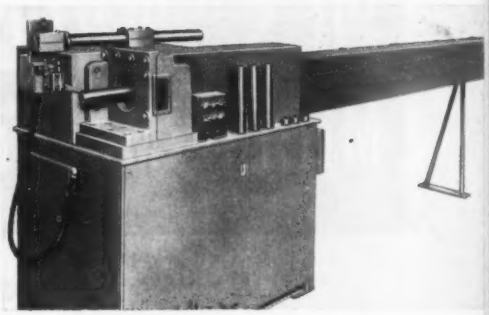
One of the Feature Attractions at Booth 440 will be newly designed clamps with hardened bushings that run full length through the clamp bars for a larger bearing surface. Also on display will be an assortment of upright, plunger and portable type clamps. Literature is available from the Detroit Stamping Co., 350 Midland, Detroit 3, Mich.
Circle Inform-A-Gram No. A10.

Ground Tool Bits and ground cut-off blades which have never been shown at any show will be on display in Booth 232 at the A.S.T.E. show by the Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago 30, Ill. Also on exhibit will be tool holders, wrenches, set-up and hold down tools and socket wrench sets. Bulletin available.
Circle Inform-A-Gram No. A11.

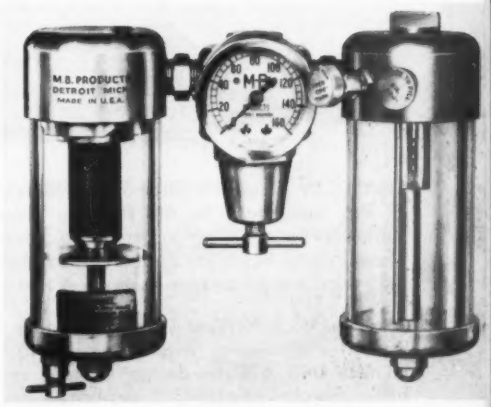
Fixture Clamp Adaptions. The photo shows five of the many modifications of standard fixture clamps that will be on display in Booth 113 by the Morton Machine Works, 2421 Wolcott Ave., Detroit 20, Mich. Further data available.
Inform-A-Gram No. A12.



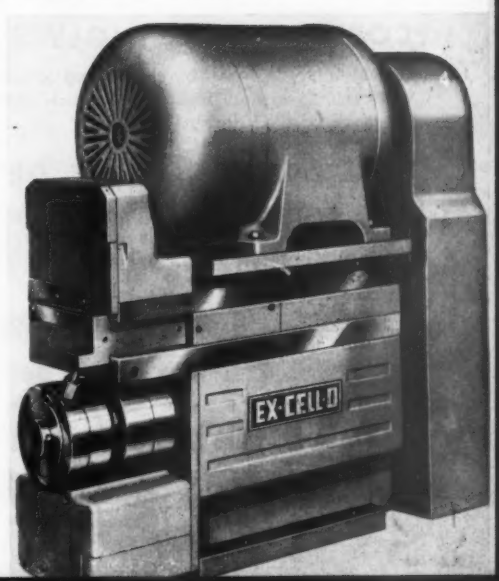
Tube Cutter. This new machine cuts the tube without waste or loss of stock and leaves a flat unburred edge. It will be on display in Booth 622. Further information is available from The Steel Products Engineering Co., Springfield, Ohio.
Inform-A-Gram No. A13.



New Lubricator. This new product of M-B Products, 46 Victor Ave., Detroit 3, Mich., can be seen in Booth 1439. It features positive air shut-off without shutting down the air line by closing valves on the head. Write for further information, or—
Inform-A-Gram No. A14.



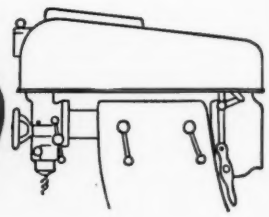
New Power Unit. This new Ex-Cell-O quill-type hydraulic power unit will be introduced in Booth 1526. Literature can be had from the Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich.
Inform-A-Gram No. A15.



NEWEST OF THE U. S.-BURKE SUPER-VALUE MACHINE TOOLS

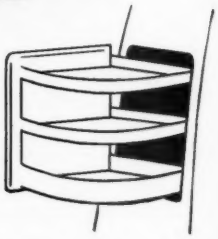
THE ECONOMICAL ANSWER TO ACCURATE, VERSATILE VERTICAL and ANGULAR MILLING

"U. S." VERTICAL Milling Machine



Balancing of head and motor and very substantial column provide increased rigidity and accuracy.

Another feature is the built-in spot light which assures maximum visibility at most vital points.



Swing-out shelves handily house tools right in the column of the machine.

Thoroughly tested on the job by many of America's foremost manufacturers.

Created by America's foremost producers of small milling machines, to fill the big need for a balanced-head vertical miller that provides greater capacity and flexibility than is normally associated with machines of its type.

The new U. S. Vertical ideally combines most advanced engineering, experience of practical machinists and modern design without sacrifice of basic characteristic "U. S." simplicity.

COSTS SURPRISINGLY LITTLE

Quickly pays for itself by simplifying or taking over vertical milling and boring jobs which often tie up far more costly standard machines.

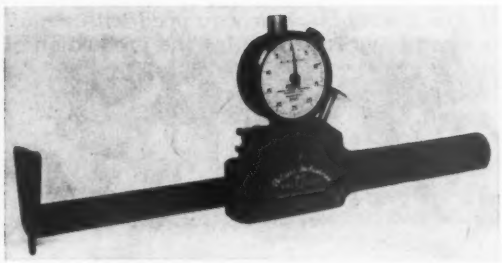
SEND FOR COMPLETE DETAILS

Illustrated literature which describes complete specifications, capacities, exclusive features and advantages gladly furnished on request.

U. S. BURKE
MACHINE TOOL DIV.

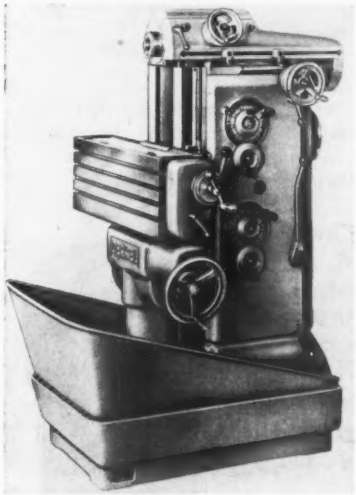
Brotherton Road 7,
Cincinnati 27, Ohio

CIRCLE INFORM-A-GRAM KEY No. 108



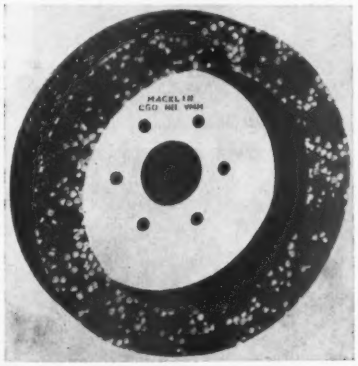
Reliant Industries, 4947 Firestone Blvd., South Gate, Calif., will feature this instrument at Booth 326. Illustrated literature on this and other Reliant products is available. A16.

This Deckel Universal Milling & Boring Machine is one of nine new machines on exhibit at Booth 1559, by the Cosa Corp.,



Chrysler Bldg., New York 17, N. Y. Improvements of this model include increased size of workpiece capacity. Write for further data. **Inform-A-Gram No. A17.**

The Macklin MM Wheel for grinding carbide tools will be demonstrated at Booth 1409. Macklin Sales Co., Jackson,



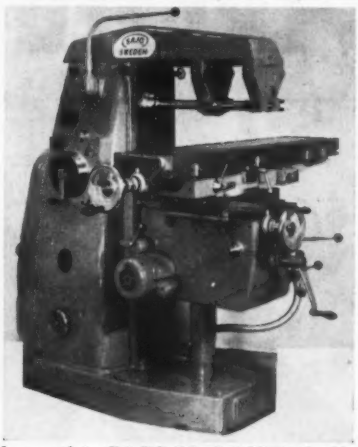
Mich., claims wheel life is increased 300 per cent with a decrease of wheel and labor costs. Write for further data or **A18.**

A New Dual-Action Blade Lock for insert type milling cutters and boring heads will be introduced for the first time in Booth 1255 by the Wesson Co., 1220 Woodward Hts. Blvd., Ferndale 20, Mich. A new staggered tooth and half side milling cutters, also, will be shown. **A19.**

Reversible Thread Plug Gages will be featured in Booth 332 along with other gage products

of the Size Control Co., 2500 W. Washington Blvd., Chicago 12, Ill. Complete data on these plug gages is contained in Size Control's Catalog No. 53. **Circle A20.**

Milling Machine. Austin Industrial Corp., 76 Mamaroneck Ave., White Plains, N. Y., will



have this SAJO Model UF-54 all-geared universal milling machine on display at Booth 1334. Further information available. **Circle Inform-A-Gram No. A21.**

A Triple-Chip Segmental Circular Saw Blade 84" in diameter, will be featured in Booth 731 by The Motch & Merryweather Machinery Co., 715 Penton Bldg., Cleveland, Ohio. Also on display will be a Kroslok face milling cutter. The company has literature available on these products. **Circle Inform-A-Gram No. A22.**

SOLID CARBIDE HOLE BROACH
SOLID CARBIDE DRILLS
SOLID CARBIDE BROACHING RINGS
SOLID CARBIDE DRILL BUSHINGS
SOLID CARBIDE SINGLE BROACH TOOL
SOLID CARBIDE WIPING BLADE
CARBIDE TIPPED FLAT TYPE MOTOR BLOCK BROACH TOOLS
30105-1

For information concerning these and other tungsten carbide tool products, which will be on display in Booth 1455, write to Willey's Carbide Tool Co., 1340 W. Vernor Highway, Detroit 1, Mich., or — A23.

"TRI·FLU·MIC"

$65.00

A direct reading micrometer for three-fluted tools

●This Tri-Flu-Mic completely overcomes the usual problems presented in measuring three-fluted tools.

It accurately measures the diameter of three-fluted end mills, taps, reamers, etc., as easily and quickly as a standard micrometer measures a square bar. Exact diameters are read directly in .001".

It also may be used to determine the true roundness of cylindrical work.

The Vee anvil is 5/16" wide. Measuring surfaces of both anvil and spindle are hardened tool steel for long accurate service. Frame and head are finished in Silver Mist chrome. Graduations are black for easy reading. Normal size range is 3/32" to 1". Other sizes as well as micrometers with tungsten carbide measuring surfaces are also available. Write for name of nearest jobber and new Tumico catalog.

TUBULAR MICROMETER CO.
BOX 30 ST. JAMES, MINNESOTA

See complete line including many new

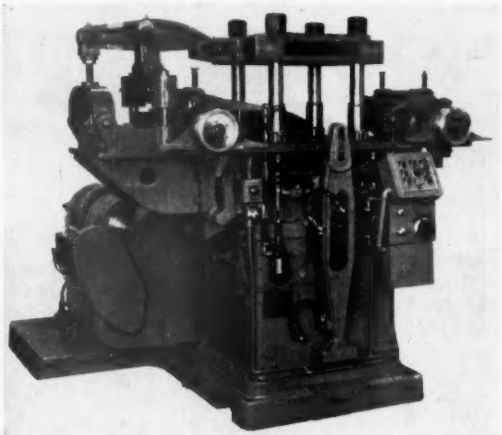
TUMICO

PRECISION TOOLS

At Booth 328 at **ASTE** *in Philadelphia*

CIRCLE INFORM-A-GRAM KEY NO. 110

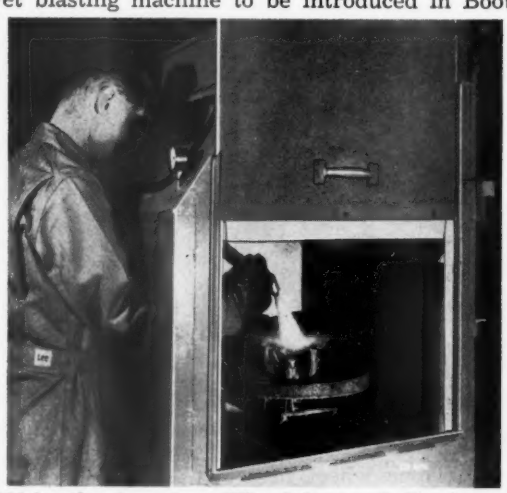
A 60-Ton Dieing Machine, equipped with a multiple-section progressive die for the production of



a drawn stamping, will be shown in Booth 1060 by Henry-Wright, Hartford 1, Conn. Further information on this machine is available.
Circle Inform-A-Gram No. A24.

Keyless Drill Chucks that can be used any place a drill is used will be on display by the K.O. Lee Co., Aberdeen, S.D., in Booth 842. Also on exhibit at this booth will be expanding mandrels for milling, turning and grinding. Literature on these products is available.
Inform-A-Gram No. A25.

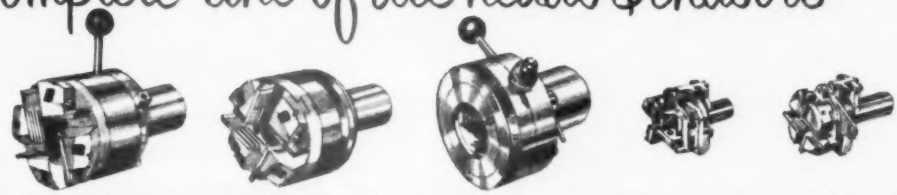
Wet Blasting Machine. Here is a closeup of a blasting compartment in the Model 30 Liquamatte wet blasting machine to be introduced in Booth



1209 by the American Wheelabrator & Equipment Corp., 1183 S. Byrkit St., Mishawaka, Ind. The part being cleaned is a glass bottle mold section. Literature is available.
Circle Inform-A-Gram No. A26.

Jones & Lamson offers...

a complete line of die heads & chasers

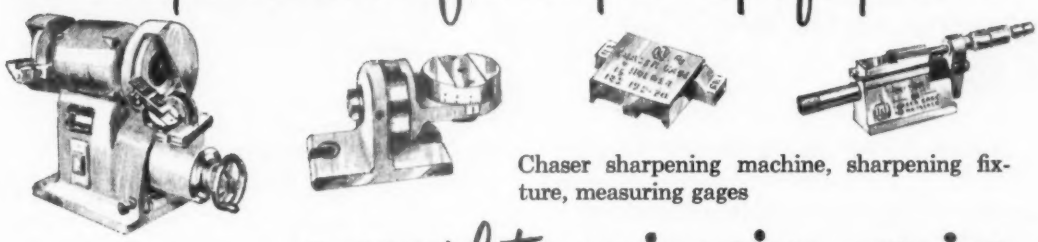


Automatic opening tangent stationary and revolving types, radial stationary type, B&S and small turret lathe types

a complete line of accessories

External and internal trip attachments, drill press adapter, floating holders

a complete line of sharpening equipment



Chaser sharpening machine, sharpening fixture, measuring gages

a complete engineering service

World's newest, most modern thread tool plant. Complete literature for all J&L thread tool products

J&L Automatic Opening Die Heads and Chasers assure: low initial cost — ease of operation — controlled resharpening — use of carbide where applicable. Class III threads guaranteed. This means important savings regardless of your tolerance requirements. Write to Dept. 710 for complete information.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., 519 Clinton St., Dept. 710, Springfield, Vt., U.S.A. J&L THREAD TOOL DIV.

CIRCLE INFORM-A-GRAM KEY No. 111

T-SLOT CUTTERS

• You can increase your production through the faster feed possible with these Weldon T-Slot Cutters.

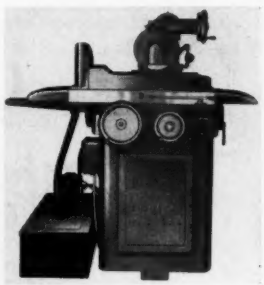
They have far greater chip room than is usually found in a T-Slot Cutter. Their straight shanks fit Weldon Holders, and their initial cost is far less than taper shank type cutters.

Weldon Distributors throughout U.S.A. and Canada carry complete stocks to serve you.

WRITE FOR LATEST CATALOG NO. 10.

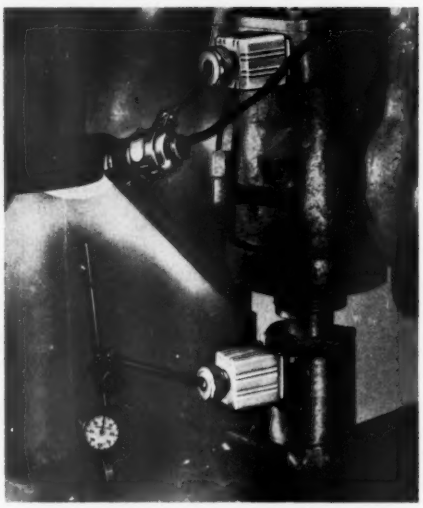
THE WELDON TOOL CO. Cleveland 4, Ohio
3000 WOODHILL ROAD

CIRCLE INFORM-A-GRAM KEY NO. 112

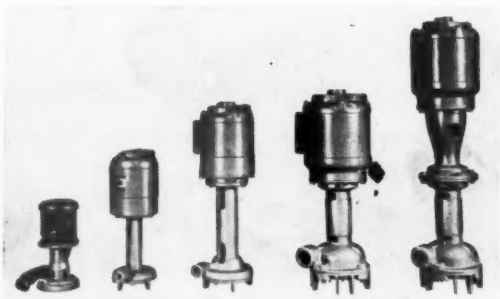


Surface Grinders will be on display in Booth 1427 by Crystal Lake Grinders of Crystal Lake, Ill. Literature on the temperature controlled spindle grinder pictured and on other machines, is available.
Inform-A-Gram No. A27.

MAGNETIC BASE TOOLS



An entirely new line of precision magnetic base test indicator holders and lights will be shown in Booth 527 by the Enco Mfg. Co., 4520-24 W. Fullerton Ave., Chicago 39, Ill. The photo shows "Tiny-Titan" No. 200 supplying light for "Tiny-Titan" No. 100, which is being used on a vertical mill to align the jig. Literature on these products is available.
Circle Inform-A-Gram No. A28.



Coolant Pumps, made by the Graymills Corporation, 3705 N. Lincoln Ave., Chicago 13, Ill., will be on display in Booth 526. They are a new line of centrifugal immersion pumps with improved mounting features. Literature is available.
Circle Inform-A-Gram No. A29.

SIGN OF PRECISION

HARDINGE means precision in its truest sense . . . not a loosely used term applied to any machine.

Precision Construction — Hardinge machines are designed and built for profitable high speed, easy operation with sustained accuracy and low tooling cost.

Precision Operation — Operators of Hardinge machines can consistently produce precision parts — and operating simplicity permits unskilled workers to produce to close tolerances without expensive tooling.

Two Lines of Hardinge Precision Machine Tools for:

Precision in the Tool Room

Designed for tool room needs, Hardinge High Speed Tool Room Machines: HLV Tool Room Lathe, TM or UM Milling Machines, and DV59 Lathe, provide extreme accuracy, high spindle speeds, and easy operation for precise, accurate results.

Precision in Production Departments

Cutting production costs to keep selling prices in line calls for these faster, more accurate, easier-to-operate Hardinge machines . . .
HC Chucking Machine, HCT Chucking Machine with Production Threading Head, and DSM 59 Second Operation Machine.

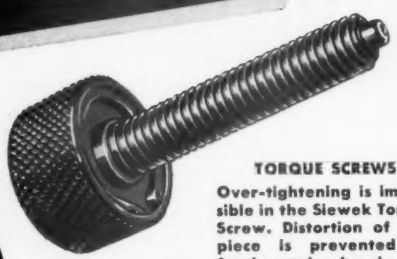
To specify Hardinge for the precision performance you want, write for complete descriptive bulletins.

HARDINGE BROTHERS, INC., ELMIRA, N. Y.
"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

CIRCLE INFORM-A-GRAM KEY No. 113

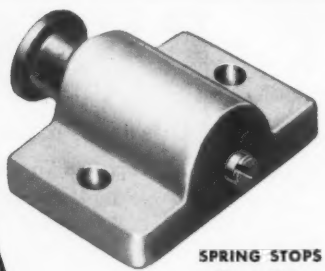
Offices in Principal Industrial Areas

NEW! IMPROVED!
SIEWEK
PRODUCTS
SAVE YOU
TIME and MONEY!



TORQUE SCREWS
Over-tightening is impossible in the Siewek Torque Screw. Distortion of part piece is prevented by freely moving head when set pressure is reached. Dis-assembly for cleaning is simple.

TOGGLE PADS
Toggle pads have 20° included angle of movement. Another Siewek exclusive is that they are available in National coarse and National fine threads.



SPRING STOPS
Sizes offer: Stroke from 3/16" to 1/4". End Pressure—14 lbs. to 32 lbs.

SPRING PLUNGERS
Only Siewek has this exclusive feature in Spring Plungers—the hardened drill-rod nose.

WRITE TODAY for CATALOG NO. 8
COMPLETE with full size Tracing Template Sheets.

SEE SIEWEK BOOTH 408 AT THE TOOL SHOW

SIEWEK TOOL CO.
2863 E. GRAND BLVD.
DETROIT 2, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 114

Surface Plate Calibration Instrument. See this rapid method of accurately calibrating surface plates at Booth 336. It will be shown for the first time at the

show. If you don't get a chance to see it, write to Rahn Granite Surface Plate, 641 N. Western Ave., Dayton 7, Ohio, or—
Circle Inform-A-Gram No. A30.

Latest Time-Saving Tool & Special Steels will be on exhibit by A. Milne & Co., 745 Washington St., New York 14, N. Y., at Booth 429. Featured will be the firm's new line of high production flat ground stock. Write for further data.
Circle Inform-A-Gram No. A31.

Tool Grinding & Barrel Finishing demonstrations will be featured at Booth 1430 by the Norton Co., Worcester 6, Mass. Also on exhibit will be diamond wheels, Crystolon K Band wheels for carbide grinding, Crystolon "Hot Rod" heating elements, Norbide dressing sticks and refractory shapes for heat treating furnaces. Literature is available on these products.
Circle Inform-A-Gram No. A32.

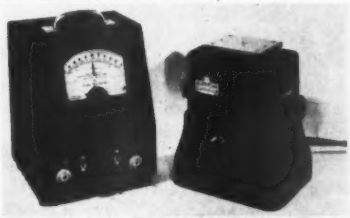
This 6" Dry Carbide Tool Grinder will be on display in Booth 1303. Bulletin 230 describes it and can be had from Hammond Machinery Builders, Inc., 1600 Douglas Ave., Kalamazoo, Mich.
No. A33.

Black Granite Surface Plate in two and four-clamp edges will be on display at Booth 430. These plates present a uniform surface

of extreme accuracy — finished up to 50 millionths inch. Descriptive data available from Collins Microflat Co., 2326 E. 8th St., Los Angeles 21, Calif.
Circle Inform-A-Gram No. A34.

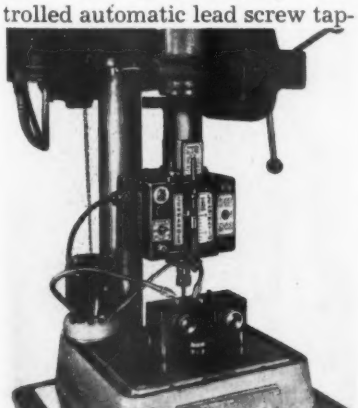
Punch Presses. designed to meet today's demand — versatility — will be on display by the Service Machine Co., 7627 S. Ashland, Chicago 20, Ill. The company has available an illustrated brochure on these presses.
Circle Inform-A-Gram No. A35.

A New Electrolimit Universal Internal Comparator designed for small diameters, will be in-



troduced at Booth 1531 by Pratt & Whitney, Hartford 1, Conn. Complete details are available.
Circle Inform-A-Gram No. A36.

Lead-Matic Tapper . Shown for the first time at Booth 823 will be this electrically controlled automatic lead screw tap-



ping attachment which fits any drill press. Detailed information can be had from the Commander Mfg. Co., 4225 W. Kinzie St., Chicago 24, Ill. **No. A37.**

Save time in gaging large dimensions with this new Ellstrom "Build-Up" Set!

What a time-saver this Ellstrom "Build-Up" Set is when it comes to checking large dimensions to millionths of an inch accuracy! And versatile, too. Six round gage blocks in step series from one to six inches, plus a standard base one-inch high. To use, just select the right combination of blocks and wring them together on the 4" diameter base. Then add standard square or rectangular gage blocks to establish the exact decimal dimensions desired! It's quick, easy, accurate . . . with far less chance of error, and none of the normal hazards encountered in building up large combinations with regular gage blocks. Won't topple over in use . . . and if accidentally knocked over, blocks are held in rigid combination by internal locking screws. Ideal for surface plate checking, setting visual gages or amplifiers, as well as for checking work on planers and horizontal boring mills. And each block is backed by the traditional heritage of Ellstrom . . . *measuring in millionths for three generations.*

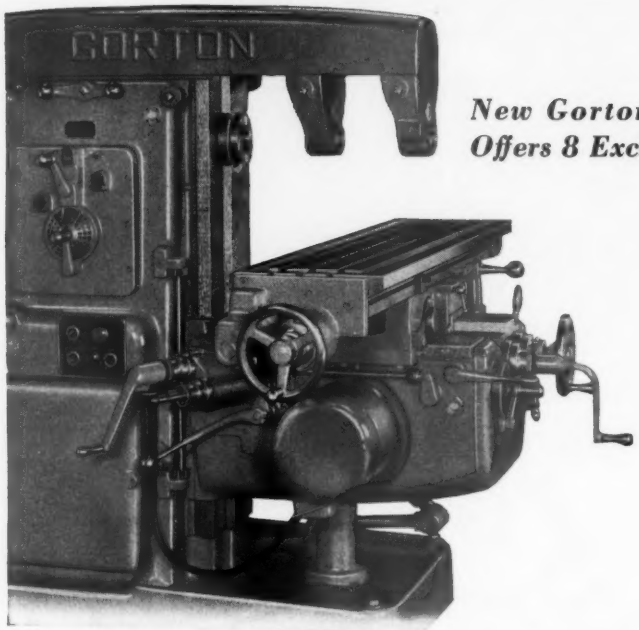
Upon Request—New fact-filled catalog containing complete specifications and prices on the entire Ellstrom Standards line. Send for it today!

ELLSTROM STANDARDS DIVISION
Dearborn Gage Company, 22035 Beech Street, Dearborn, Michigan
Originators of Chromium Plated Gage Blocks

REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA

CIRCLE INFORM-A-GRAM KEY NO. 115

New Concept in Milling



New Gorton Mill Offers 8 Exclusives

"First completely new design in years," say engineers who have seen demonstrations of the Gorton 2-28 Horizontal mill — a heavy-duty, high-speed-spindle machine suitable for carbide milling.

Square-lock bearings and a 24½-inch bearing spread on the knee provide extreme table rigidity. Even under heavy cutting loads, the table remains rigid. There can be no sag or twist.

The new Gorton Horizontals have, in addition to conventional spindle lubrication, a device that floods spindle bearings with 120 extra gallons of oil per hour. This method of cooling and lubricating dissipates spindle bearing heat throughout the column.

Net results are a marked reduction of spindle "growth" at the nose and, with only two driving gear contacts at any speed, more motor horsepower is usable at the spindle. This is a decided advantage over machines having more gears in contact and which do not dissipate spindle bearing heat as described.

A choice of three spindle speed ranges is available: 50 to 2000 rpm for carbide milling; 28 to 1100 rpm for conventional milling, or 25 to 2000 rpm for maximum work scope.

Double overload protection for cutters and gears stops all feeds when, for any reason, the cutter becomes overloaded or jammed. One is mechanical, the other electrical.

True unit construction drastically reduces down time and maintenance services. A removable coolant pan permits quick interchange of coolants and speeds sump clean-out.

A horsepower-load meter indicates cutter condition and records machine operating efficiency.

Complete information on the new, reasonably priced line of 2-28 Horizontals is available from the manufacturer, George Gorton Machine Co., 1204 Racine St., Racine, Wis., U.S.A.

Eight Gorton Exclusives Open New Era in Milling

1. **24½-inch knee**
2. **Oil-bath cooling of spindle bearings**
3. **Maximum horsepower at spindle nose**
4. **Spindle speeds from 25 to 2000 rpm**
5. **Double-overload protection for cutters**
6. **True unit construction**
7. **Removable coolant pan**
8. **Horsepower-load meter**

Motors available: 7½, 10 or 10/5 hp.

A 7789-⅔

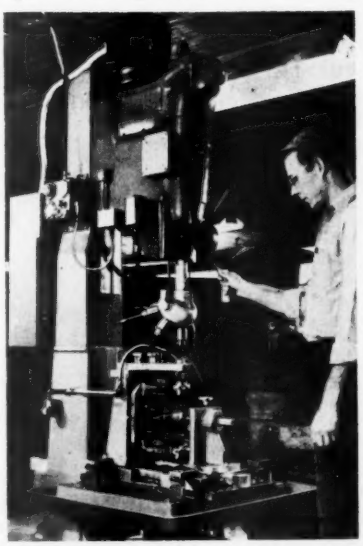
CIRCLE INFORM-A-GRAM KEY NO. 116

This New Quick-Change Holder will be on display at Booth 517. It has a Morse taper shank and adjustable keeper key

slot. Write to Beaver Tool & Engineering Corp., Box 429, Royal Oak, Mich. for complete data, or—
Circle Inform-A-Gram No. A38.

Flexible Shaft Equipment will be featured in Booth 639 by the R. G. Haskins Co., 2651 W. Harrison St., Chicago 12, Ill. Also on exhibit in this booth will be all of the tools that can be used with flexible shaft machines. Further information is available.
Circle Inform-A-Gram No. A39.

Drilling Machine. To be introduced for the first time at the tool show will be a turret drilling machine that allows one operator to perform six drilling

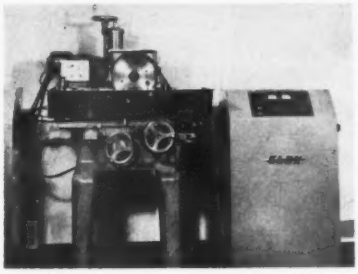


operations. It can be seen in Booth 1967. Additional data available from Howe & Fant, 521 Flaxhill Rd., S. Norwalk, Conn.
Circle Inform-A-Gram No. A40.

Tracing Templates developed by the Northwestern Tool & Engineering Co., Dayton 3, Ohio, will be the center of attraction at Booth 2122. These templates, for jig and fixture components, cover 263 items in full scale.

Circle Inform-A-Gram No. A41.

Three Electrical Discharge Machines will be exhibited by Elox Corp., 740 N. Rochester Rd.,



Clawson, Mich., at Booth 1342. Pictured is the Elox as applied to grinding. Further information furnished upon request.

Circle Inform-A-Gram No. A42.

Precision Products, such as electronic measuring instruments, a new internal tri-point micrometer and an electronic caliper, will be featured by the Brown & Sharpe Co., 235 Promenade St., Providence 1, R. I., in Booth 1402. The firm has literature available upon request.

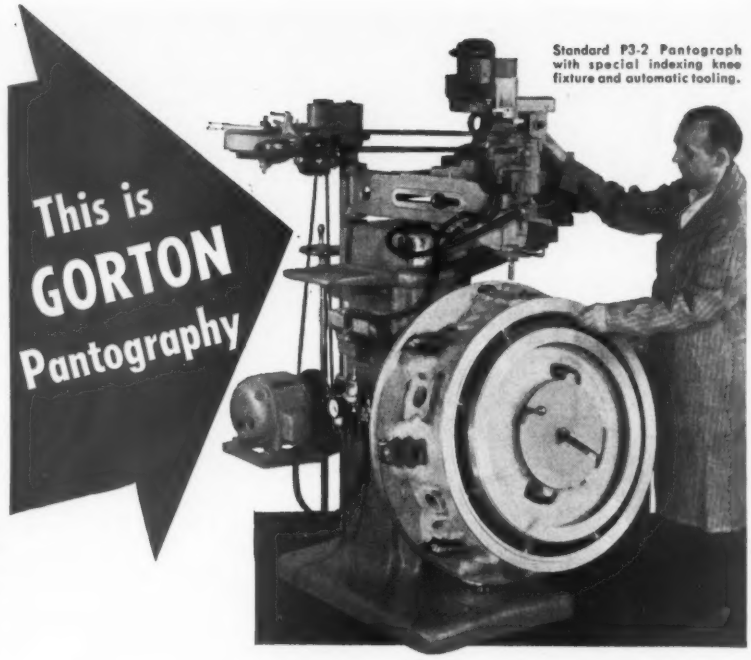
Circle Inform-A-Gram No. A43.

This 5-ton Press is the smallest of a press line ranging up to 85 tons and is available from the Sales Service Machine Tool Co.,

St. Paul, Minn. It can be seen at Booth 1538. Literature can be had by TOOLING and PRODUCTION readers.

Circle Inform-A-Gram No. A44.

This is GORTON Pantography



Standard P3-2 Pantograph with special indexing knee fixture and automatic tooling.

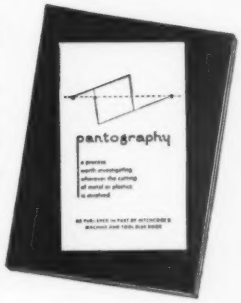
...Ready to Help You

Photo shows a standard P3-2 profiling ports in an aircraft part, a large aluminum-alloy casting. The sides of each port are parallel; one end has a true radius, the other end is parabolic. A combination of other methods would do the cutting in hours, but the P3-2, with an automatic cutting cycle, finishes each port in 2.3 minutes.

Improve Production and Lower Costs

Gorton tracer-controlled equipment does efficient profiling, routing, die sinking, mold cutting, counterboring, chamfering, grooving, graduating, engraving and many other standard or special operations. You can expect high accuracy and high surface finish, whether your work involves metals or plastics in flat, uniformly curved, cylindrical or irregular shapes.

Enlarged templates, masters or patterns, all quickly and easily made, give Gorton Pantographs advantages of increased accuracy through reduction ratios. Work pieces range in size from the diameter of a dime to 10 feet. Cutting cycle is accomplished manually or automatically.



Fill out and mail the coupon for your copies of the Gorton catalog and the informative booklet, "Pantography."

GEORGE GORTON MACHINE CO.

1204 Racine St., Racine, Wis., U.S.A.

Please send at once complete information about the Gorton line contained in Bulletin 1655-1204

Firm .....

Name .....

Title .....

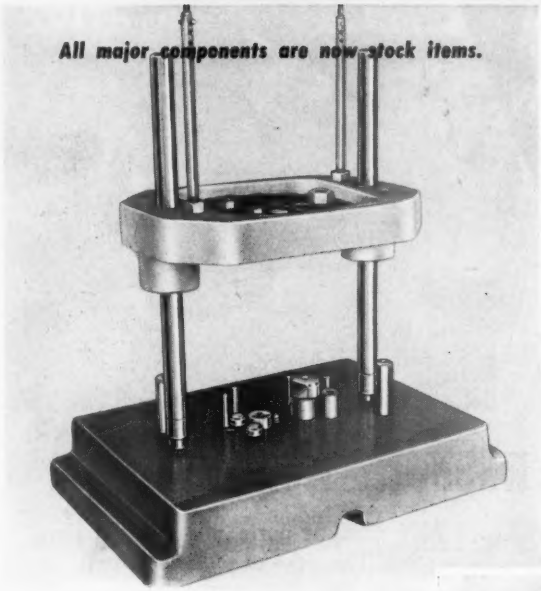
Address .....

City, State .....

A 7786-3/3

CIRCLE INFORM-A-GRAM KEY NO. 117

At Booth 1620, A.S.T.E. Show, see Zagar Standardized Self-clamping DRILL JIGS

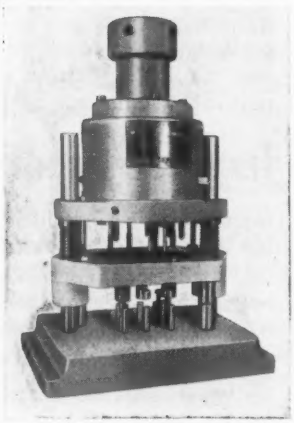


Zagar Drill Jigs are used in conjunction with Zagar gearless multiple-spindle drill heads to ream, drill and tap on standard drill presses and tapping machines.

NOTHING ELSE LIKE IT!

4 TYPES — 9 SIZES,
5 COMBINATIONS PER SIZE —
Hole Patterns 3" through 15" Dia.

SPEEDY — ACCURATE — RUGGED



A Zagar 15-spindle, 7" diameter gearless drill head mounted on Zagar standardized drill jig drills 15 holes in aircraft part.

A new concept to reach new production highs! Standardization means quick delivery and attractive price, since only a very few minor parts have to be made. Extremely fast; the operator merely feeds the parts — the Zagar Self-clamping Drill Jig does the rest. Proven design insures maximum accuracy.

ASK FOR OUR NEW DATA SHEET "T-4"

ZAGAR TOOL, INC. 24000 LAKELAND BLVD., CLEVELAND 23, OHIO

Zagar TOOLS FOR INDUSTRY and SPECIAL MACHINERY

CIRCLE INFORM-A-GRAM KEY NO. 118

This Profilometer, used with Profilometer Tracers, shows the average height of roughness irregularities in millionths of an

inch. It can be seen at Booth 229. The Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich., will be happy to furnish additional data.
Circle Inform-A-Gram No. A45.

New Chucks. De Witt Equipment Corp., 136 Lafayette St., New York 13, N. Y., will show a representative range of Burnerd Meehanite precision chucks, including typical examples of direct mounting chucks for American standard spindle noses, in Booth 1906. Further information may be had upon request.
Circle Inform-A-Gram No. A46.

Precision Bolts. The Standard Pressed Steel Co., Jenkintown, Pa., will show these extremes of its precision bolts (arrow points

to tiny screws in socket of the big bolt.) You can see the display at Booth 1539. Descriptive literature available.
Circle Inform-A-Gram No. A47.

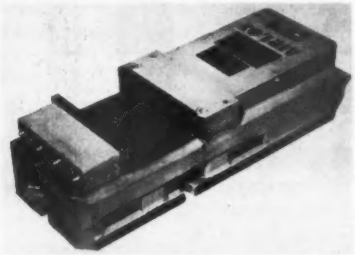
Drill Jigs. These standard products of Swartz Tool Products, 13330 Foley Ave., Detroit 27, Mich., will be on parade at Booth 843. For those who will not be able to attend the show, Swartz offers a comprehensive catalog on the jigs.
Circle Inform-A-Gram No. A48.

High Speed Ground Tool Bits will be featured at Booth 235.

You can write to The du-Mont Corp., Greenfield, Mass, for data or— **Inform-A-Gram No. A49.**

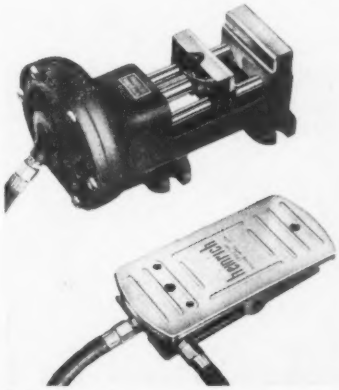
Carbide and High Speed Cutting Tools will be on display by the Spiral Step-Tool Co., 5400 N. Damen St., Chicago 25, Illinois, in Booth 1351. Write for literature available, or—
Circle Inform-A-Gram No. A50.

Airlox Pneumatic Vises will be demonstrated in Booth 1971. Pictured is the improved S-7 vise.

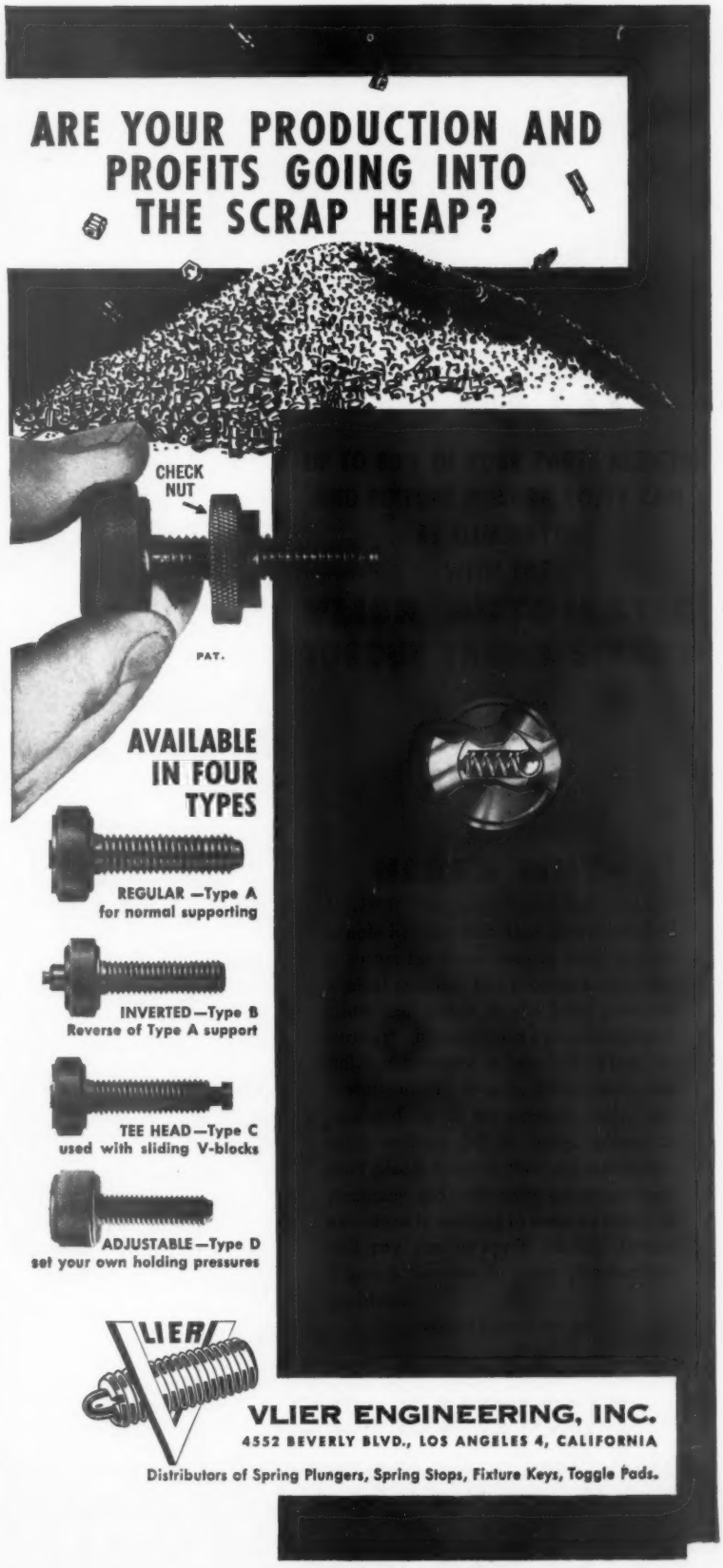


Descriptive literature is available from Production Devices, Inc., Whitehall, N. Y.
Circle Inform-A-Gram No. A51.

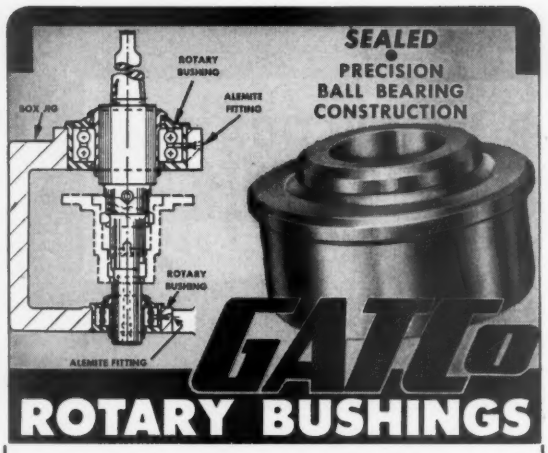
New Air. Gripping with a force 15 times air line pressure, this 3" width vise jaw is adjustable to a maximum opening of



3-⅛" with maximum travel of ⅜". It can be seen in Booth 1646 and additional information is available from Heinrich Tools, Inc., Racine, Wis. **No. A52.**


ARE YOUR PRODUCTION AND PROFITS GOING INTO THE SCRAP HEAP?
CHECK NUT
PAT.
AVAILABLE IN FOUR TYPES
REGULAR —Type A for normal supporting
INVERTED—Type B Reverse of Type A support
TEE HEAD—Type C used with sliding V-blocks
ADJUSTABLE—Type D set your own holding pressures
VLIER
VLIER ENGINEERING, INC.
4552 BEVERLY BLVD., LOS ANGELES 4, CALIFORNIA
Distributors of Spring Plungers, Spring Stops, Fixture Keys, Toggle Pads.

CIRCLE INFORM-A-GRAM KEY NO. 119



FOR

DRILLING
CORE DRILLING
ROUGH
AND
FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear —Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

GATCO ROTARY BUSHING CO.

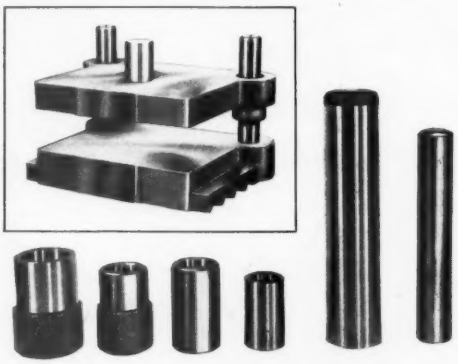
42330 ANN ARBOR RD., U. S. 12, PLYMOUTH, MICH.

Telephone PLYMOUTH 1472

CIRCLE INFORM-A-GRAM KEY NO. 120A

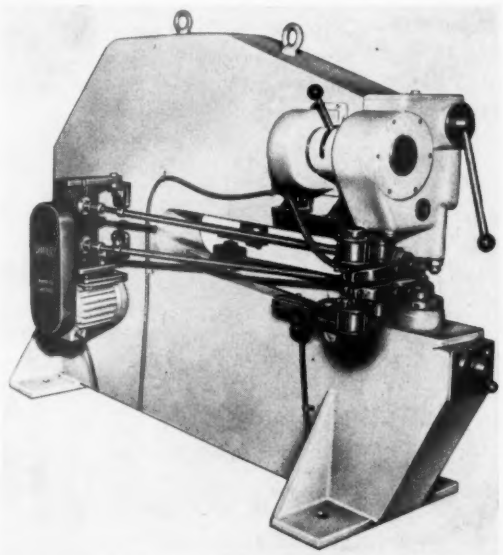
Precision Holding Tools. In Booth 805, the Erickson Tool Co., 2309 Hamilton Ave., Cleveland 14, Ohio, will introduce an entirely new line of self-releasing tap holders plus the latest additions to its line of other precision holding tools. Further data is available. **Inform-A-Gram A53.**

Precision, All Steel Die Sets made by Superior Steel Products Corp., 2754 S. 19th St., Milwaukee, Wis., will be on display in Booth 103. Also on ex-



hibit will be Superior precision pins and bushings, lock jaw lifting devices and other die supplies. Helpful data on these products is available. **Circle Inform-A-Gram No. A54.**

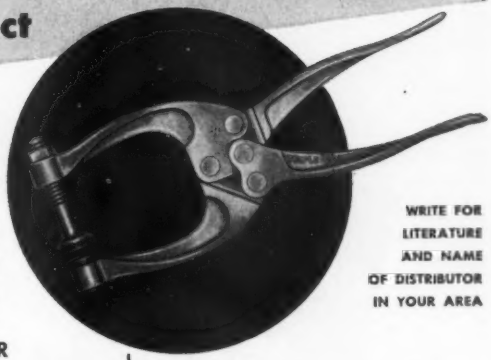
Power Feed. Feature of the Pullmax exhibit in Booth 1703 will be the Pullmax Power Feed designed to aid in cutting and working steel plates



up to 11/32″ thick. Information and literature is available from the American Pullmax Co., Inc., 2455 N. Sheffield Ave., Chicago 14, Ill. **Circle Inform-A-Gram No. A55.**

HAVE YOU A CLAMPING PROBLEM?

Solve It With a Triple-E Product



NEW TRIPLE-E Portable Clamps

GREATER GRIP — NO MARRING OF SURFACE

A portable, toggle action clamp with generous throat depth for clamping operations. Adapts itself to any surface, smooth, round or irregular. Spindle and anvil may be reversed. Sufficiently long handles with comfortable grip can not interfere with toggle action. Handles and jaws of steel forgings with steel bearing pins. Cadmium plate finish. Furnished with or without rubber tips or spindle and anvil. Two sizes, Jaw Capacities 1" and 1¾".

WRITE FOR LITERATURE AND NAME OF DISTRIBUTOR IN YOUR AREA

LA-KO TOGGLE CLAMPS

Made from stampings; sturdy, withstands hard usage. Patented Hardened steel bushings at pivot points assure long wear. Holding pressure up to 650 lbs.

THAYER TOGGLE CLAMPS

Rugged, for Heavy-duty work. Hardened steel serrated bushings at pivot points. Hold down arms and handle made of ¾", 1" and 1¼" square solid steel. Holding pressure up to 6000 lbs.

MERRIMAN PRESSURE UNITS

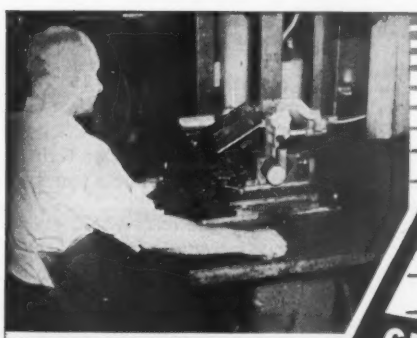
Takes the place of a screw. Easily adjusted for amount of travel or clearance desired. 3 lengths, 6, 8 and 10 inch. Standard model applies pressure up to 100 lbs; Heavy-duty model applies pressure up to 300 lbs.

ALSO: TRIPLE-E BURRING TOOLS, MERRIMAN BUSHINGS, SINE ADJUSTABLE DRILL GUIDES

E & E ENGINEERING CO.

P. O. BOX 84, KENSINGTON STATION
DETROIT 24, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 121A



FRICTION SAWING WITH Tannewitz HIGH SPEED BAND SAWS

GREATEST COST SAVER IN METAL CUTTING

Tremendous savings of time and money are effected in trimming formed parts with Tannewitz High Speed Band Saws, for not only are the cuts made exceedingly fast, and smoothly, but in most cases no jigs or rests of any kind are required. Sheets of both hard and soft steel, and even such metals as 1" armorplate are handled with great advantage by this method, and it is ideal for trimming malleable and steel castings. By all means get the complete facts and learn of the many opportunities for boosting production and lowering costs that Friction Sawing with Tannewitz High Speed Band Saws offers. Write for circular.

for trimming castings of all metals write for bulletin on "Foundry Band Saws".

GL-6-1729

SAWING MACHINERY SPECIALISTS

The TANNEWITZ WORKS GRAND RAPIDS MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 121B

Use KIPP AIR GRINDERS if you want to GRIND —not just rub!

MODEL JA
50,000 R.P.M.
$42.00
IN U.S.A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle.

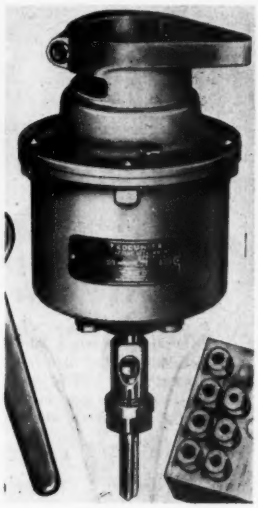
It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. Every mechanic knows this, but inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

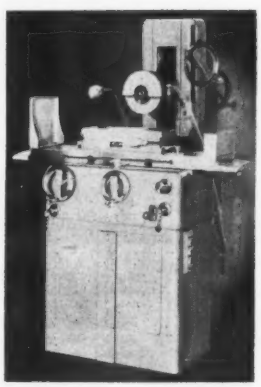
MADISON-KIPP CORP.
212 Waubesa St., Madison, Wis., U.S.A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

CIRCLE INFORM-A-GRAM KEY NO. 122

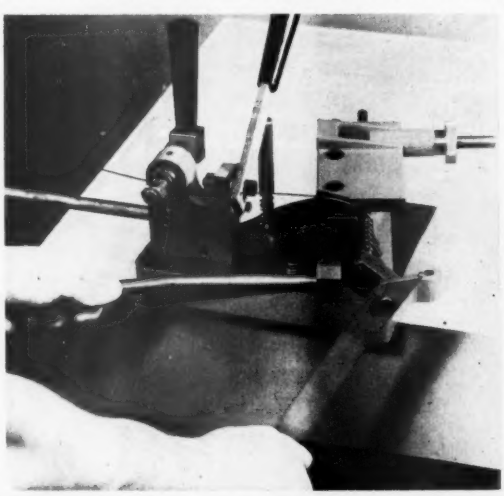


Tapping & Threading Techniques, both basic and advanced, will be featured by the Procunier Safety Chuck Co., 18 S. Clinton St., Chicago 6, Ill., in Booth 1621. Also on exhibit at this booth will be quick change chucks and collets. Further information is available. **Circle No. A56.**



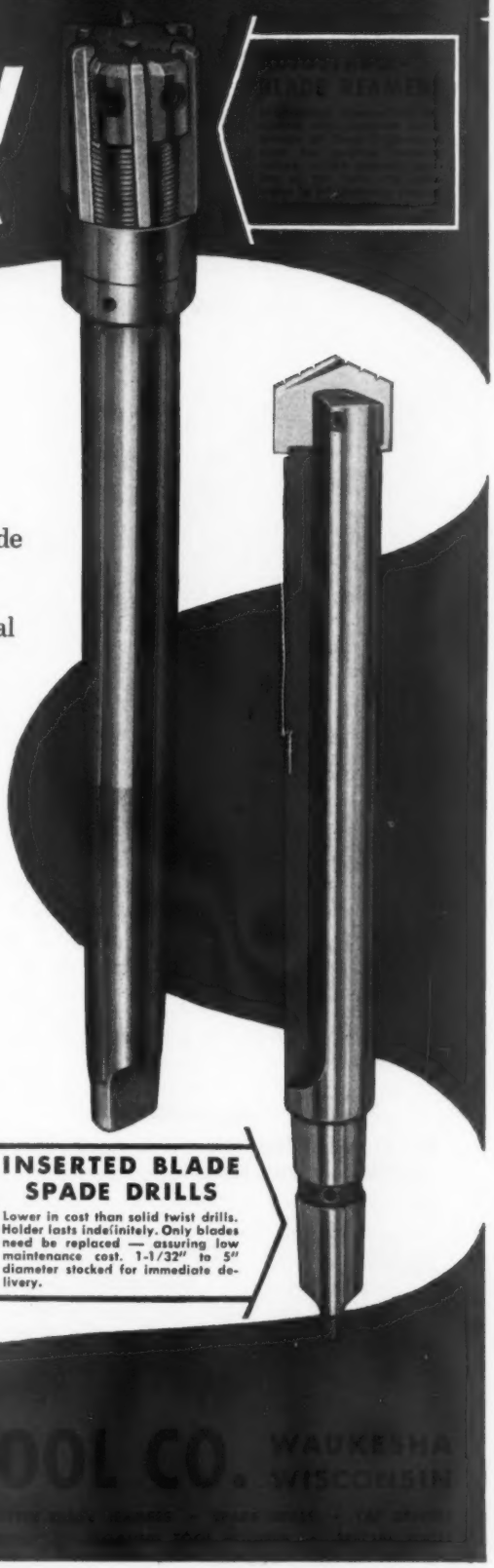
Hydraulic Surface Grinders will be displayed in Booth 1809 by the Boyar-Schultz Corp. 2110 Walnut St., Chicago 12, Ill. The grinder shown is built to accommodate a 6 x 18 chuck and its actual capacity is 7-1/4" x 19". Information on this and other Boyar-Schultz products that will be on parade at the tool show is available. **A57.**

This New Hand Operated Spring Winder will be just one of O'Neil-Irwin's contributions to the Tool



Show. It can be seen, along with other firm products in Booth 1403. If you desire literature, write to the O'Neil-Irwin Mfg. Co., 626 Eighth Ave., Lake City, Minn., or— **Circle Inform-A-Gram No. A58.**

"Standards" by WAUKESHA



. . . meet most of your Cutting Tool Needs . . . most of the time!

The use of Waukesha Standard Inserted Blade Reamers, Spade Drills and Counterbores eliminates substantial investments in "special tooling". The adjustability, adaptability and ready availability of standard Waukesha Cutting Tools save costly engineering time, eliminate down time for new tooling. You can make savings in your cutting tool costs by specifying Standard WAUKESHA Cutting Tools.

consult WAUKESHA

. . . for competent cutting tool counsel. Waukesha sales representatives and engineers are qualified to work with your own staff in adapting standard Waukesha Tools to your needs . . . or in the development of special cutting tools.

INSERTED BLADE SPADE DRILLS

Lower in cost than solid twist drills. Holder lasts indefinitely. Only blades need be replaced — assuring low maintenance cost. 1-1/32" to 5" diameter stocked for immediate delivery.

WAUKESHA TOOL CO. WAUKESHA WISCONSIN

Let Us Prove...

better, faster production at lower cost

Precise concentricity for long tool life and smooth cut

Correct spiral for fast cutting

High polish promotes chip flow

Improved rake angles for minimum loading

job-engineered, master-machined

Choose FORD

HSS GROUND CUTTERS

The superior performance of FORD HSS Ground Cutters has been proven in on-the-job tests in countless applications, on ferrous or non-ferrous materials. If faster, better production at lower cost is your goal, get the facts on FORD.

FORD -- *the complete line!*

HSS ground cutters, rotary files, countersinks
CARBIDE cutters, end mills, grinding burs

Complete Details, Operating Data

All specifications plus informative operational data on more than 300 FORD rotary tools contained in new FORD Catalogue No. 207. Write for yours!

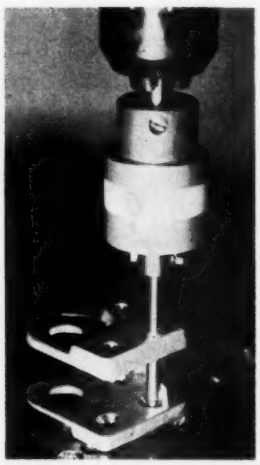
FORD regrinding service adds tool life, reduces tool costs!

M. A. FORD MFG. CO., INC.

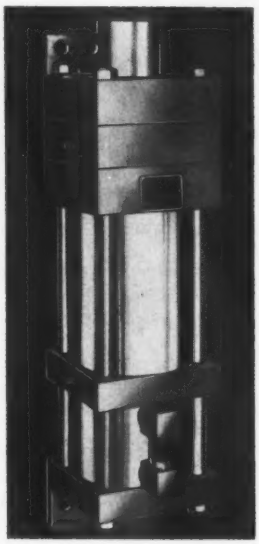
Pioneers in rotary tools for more than 30 years

DAVENPORT 1, IOWA

CIRCLE INFORM-A-GRAM KEY NO. 124



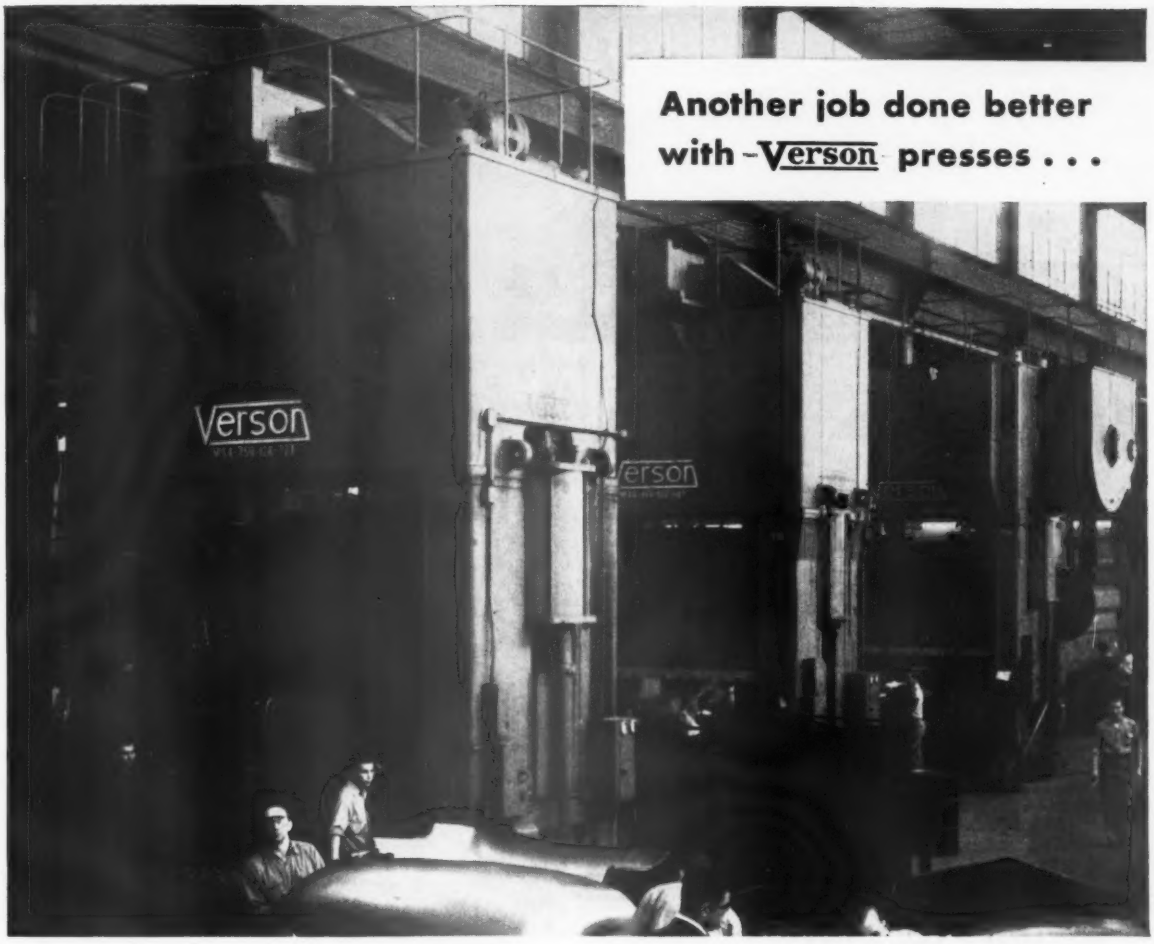
Back-Countersinks and Back Spot Facers for rapid production of back countersinking or back spot-facing in nonferrous metals will be on display in Booth 1972 by the Nobur Mfg. Co., 717 N. Victory Blvd., Burbank, Calif. Information on these and other Nobur products is available. **Inform-A-Gram No. A59.**



The "Fluid Pressure Booster" display stand will be one of the main attractions at the "College of Cylinder Knowledge" Booth 1360 of the Miller Fluid Power Co., 2040 N. Hawthorne Ave., Melrose Park, Ill. Given away free to qualified visitors will be special slide rules containing some new, valuable scales in addition to the standard engineering scales. Literature on the Miller products is available to TOOLING and PRODUCTION readers. **Inform-A-Gram No. A60.**

Variable Speed Lathe. In Booth 908, visitors will have their first opportunity to view the new 12" swing Logan variable speed lathe in operation.

Other Logan products also will be on display. For further literature and information write to Logan Engineering Co., 4908 Lawrence Ave., Chicago 30, Ill., or— **Circle Inform-A-Gram No. A61.**



This Verson line-up turns out truck cab tops for Morrison Steel Products, Inc.

Typical of the countless routine jobs that are being done better every day with Verson Presses are the truck cab tops manufactured by Morrison Steel Products, Inc. Buffalo, New York. In the line-up shown above are two Verson four point full eccentrics rated at 750 tons and 400 tons and a Verson two point full eccentric of 750 tons capacity.

Nothing outstanding about this installation?

No, except that like so many manufacturers doing routine jobs, Morrison Steel Products has taken advantage of Verson's high standards of performance and economy. For the manufacturer this means better stampings at lower overall cost. This is proved by experience on all kinds of jobs over a period of a third of a century.

Whatever your press needs, whether the job is routine or one-of-a-kind, it will pay you to put Verson's experience and know-how to work for you. Catalog G-52 summarizes the complete Verson line and gives typical specifications. Write for your copy, today. There is no obligation on your part.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9335 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • SO. LAMAR AT LEDBETTER DRIVE, DALLAS, TEXAS

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

CIRCLE INFORM-A-GRAM KEY No. 125

Tooling Time and Cost *Slashed* with Ren-ite* Epoxy Resins.

The first dimensionally stable plastic, successfully used for over three years, in industrial tooling programs.

America's leading manufacturers are shaving time and costs from their present tooling programs with the use of Ren-ite Epoxy materials.

Free engineering service and no contracts required

REN-ITE is a modified Epoxy thermosetting resin for use as a tooling plastic without application of heat or pressure for general tooling applications.

FRONT END CHECKING FIXTURE SHOWING THE USE OF REN-ITE STOCK PLASTIC TUBING.

We invite you to try Ren-ite products in your tooling program. Write for further information and price schedules on complete Ren-ite line.

Ren•ite PLASTICS, INC.

POST OFFICE BOX NO. 1256, LANSING 4, MICH.
OFFICES IN CHICAGO, CLEVELAND, DETROIT, LOS ANGELES, NEW YORK AND ST. LOUIS.

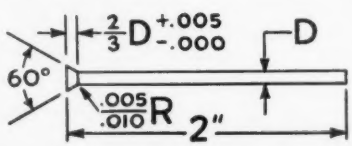
*"Ren-ite," "The Dimensionally Stable Tooling Plastic" and "Comminuted for Quality" are Trademarks of Ren-ite Plastics, Inc.

CIRCLE INFORM-A-GRAM KEY NO. 126A

Can you make your own at *TWICE* the price?

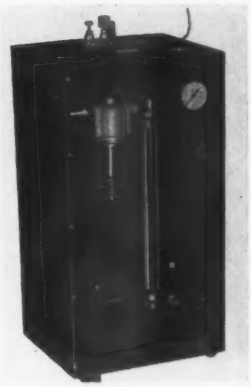
±.0003" centerless ground PERFORATING PUNCHES

Save time, money, detail work. Use standard precision Perforating Punches—tough, durable, 57 Rc hard, with square, sharp cutting ends—for a few cents apiece. Heads are annealed with plus tolerance for finishing. 2" long in sizes up to .125"; all others 2½". In stock for immediate delivery: Diameters .024" to .110" inclusive in .001" steps; also .125", .128", .130", .141", .156" and .1875". Write for full details.



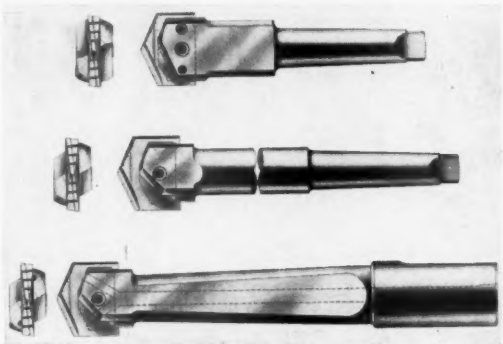
ROSS TOOL COMPANY
1517 Lyell Avenue, Rochester 6, New York

CIRCLE INFORM-A-GRAM KEY NO. 126B



This Mist Cooling Unit can be seen in Booth 1251. It is a new and improved version and will be introduced by the Air Conversion Research Corp., 4107 N. Damen Ave., Chicago 18, Ill. Write for further information, or—**Circle No. A62.**

"Conner Type" Spade Drills can be seen in Booth 225. These cutters come in sizes 1-1/64" through 5" diameter, and are held by holders in



only eight ranges of sizes. A catalog, just off the press, describing the spade drills, can be had from The Gairing Tool Co., 21221 Hoover Rd., Detroit 32, Mich. **Circle Inform-A-Gram No. A63.**

This Adjustable Balljet Spindle Kit that permits four different gaging spindles for any size between 1" and 3" to be assembled and placed in use at the

same time can be seen along with many other Sheffield products in Booth 325. Information and literature on these products is available from the Sheffield Corp., Dayton 1, Ohio.
Circle Inform-A-Gram No. A64.

READ WHAT BLOOMER OF CHICAGO SAYS

ABOUT WALES HOLE PUNCHING UNITS

MONEY AND TIME SAVING FEATURES . . .

See WALES Equipment in operation at the ASTE SHOW in Philadelphia APRIL 26-30 BOOTH 1830

"NOT ONLY PAID FOR THESE WALES UNITS AND THE PRESS BRAKE BUT ALSO MADE OUR NORMAL PROFIT ON THE JOB"

"SETUPS WITH WALES UNITS ARE 8 TIMES FASTER THAN OUR FORMER GANG PUNCHING METHODS"

"ABLE TO DOUBLE THE RATED PRESS CAPACITY BY STAGGERING SHUT HEIGHT OF WALES UNITS WITH CAPS ON TOP OF PUNCHES"

"ELIMINATE STRIPPING PROBLEMS, SPOILED WORK FROM IMPROPER STRIPPING, AND BROKEN PUNCHES"

BLOOMER HEATING & VENTILATING CO.

Contractors - Fabricators

1237 WEST 47TH STREET · CHICAGO 9, ILL.
FRontier 6-2233

February 26, 1954

Wales-Strippit Corporation
408 Madison Avenue
Oak Park, Illinois

Attention: Mr. Homer G. Gray

Gentlemen:

Very seldom in the operation of a fabricating plant have I come across such cost and time saving opportunities as have been made possible by Wales Hole Punching Units.

To give you a little background, my company bid a job, based on our former gang punching method of tooling, and after we received the order as low bidder, I investigated and bought Wales Units. In addition, we purchased another press brake. The cost records show that we not only paid for these Wales Units and the press brake with this one job but also made our normal profit on the job. We also bettered our delivery estimate by six weeks. Since the completion of this first order I have been using these same Wales Units on similar jobs.

My experiences have proven that setups with Wales Units are eight times faster than our former gang punching methods. Press downtime between setups is practically eliminated by mounting these Units on templates outside the press and just placing the entire assembly on the press bed, ready to start punching.

We were able to double the rated press capacity by staggering the shut height of Wales Units with caps on top of punches. Your Wales Units eliminate stripping problems, spoiled work from improper stripping and broken punches.

I thought you would be interested in these highlights of my experience with your tooling equipment and so I am enthusiastically passing along to you the results of my experiences with Wales Hole Punching Units. I am also enclosing photographs of your equipment in operation.

Very truly yours,

BLOOMER HEATING & VENTILATING COMPANY

E. Ellis
Plant Superintendent

EE:rp

This letter from Bloomer Heating & Ventilating Company points out typical time saving and money saving advantages that are also experienced by the thousands of users of Wales Hole Punching Units.

Patented, independent, self-contained Wales Units permit the same group of units to be used and reused in unlimited hole punching setups without aligning punches and dies in the press.

Write for the fully-illustrated, functionally colored catalogs that completely describe Wales Hole Punching Units.

WALES-STRIPPIT CORPORATION

George F. Wales, Chairman

355 Payne Avenue, North Tonawanda, N. Y.
(Between Buffalo and Niagara Falls)

Wales-Strippit of Canada Ltd., Hamilton, Ontario

Specialists in Punching and Notching Equipment

Wales Type "CJ" Hole Punching Units in operation in Bloomer Heating & Ventilating Company's plant with work in position ready to be punched.
Showing in the foreground the finished work punched by Wales Type "CJ" Hole Punching Units.

CIRCLE INFORM-A-GRAM KEY No. 127

Drill More Holes Per Hour
In ANY Pattern . . .
On ANY Drill Press

with a *Adjustable* **MULTI-DRILL**

DRILLS 2 to 8 HOLES at ONE STROKE

Increase production up to 800% . . . save time, cut costs. MULTI-DRILLS make *any* drill press produce *more*. Attached without alterations or special tools. Quick, easy setups of universally adjustable spindles give you more flexibility . . . wider application. Handles any hole pattern within 9" circle; centers close as ½". Extension Spindles available to increase working area to 22½". Special adaptations available.

model 900

DRILLS ANY HOLE PATTERN

See Us at Booth No. 823
A.S.T.E. Show, Philadelphia, Pa.

COMMANDER MFG. CO.
4228 W. Kinzie St. • Chicago 24, Illinois
Product of *Commander* . . . Builder of Production Tools

CIRCLE INFORM-A-GRAM KEY NO. 128A

CIRCLE INFORM-A-GRAM KEY NO. 128C

CUSTOM MADE PRECISION STAMPINGS IN SMALL LOTS

Since 1921 we have specialized in the production of accurate die-cut metal stampings in small lots. The tool cost is low . . . actually as low as 15% to 20% of the cost of permanent tools. We guarantee dependable service and delivery on date specified.

• **SEND** us a sample or blueprint. We'll quote you a price. Or write for detailed information.

DAYTON ROGERS
Manufacturing Company
Minneapolis 7B, Minnesota

CIRCLE INFORM-A-GRAM KEY NO. 128B

LAPPING AND GRINDING COMPOUNDS

GRADE 17 (Medium) GRADE 18 (Medium Fine)
GRADE 19 (Fine)
SPECIAL COMPOUNDS FOR BRASS AND BRONZE
PLUG COCK VALVES

Also precision lapping compounds for gages, tools, instruments. Write for free sample kit containing six liberal jars, different grades.

Photo courtesy Hays Mfg. Co.

These three grades of compounds have a special water soluble base that possesses excellent lubricating qualities for grinding various styles of plug and key cock valves. These compounds do not "niggard or score" while grinding —a common trouble with most compounds. They contain abrasives of the proper grit size for grinding or lapping-in brass and bronze plug valves. The finished parts can be washed with ordinary water.

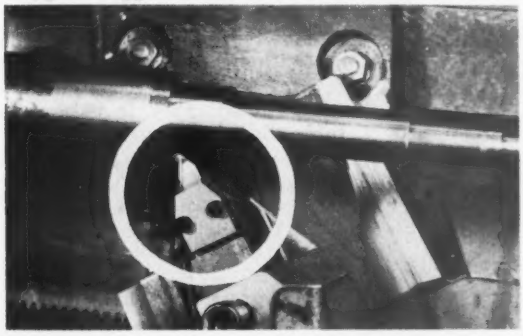
Generous samples sent upon request

UNITED STATES PRODUCTS CO.
518 MELWOOD ST. USP Co. PITTSBURGH, PA.

CIRCLE INFORM-A-GRAM KEY NO. 128D

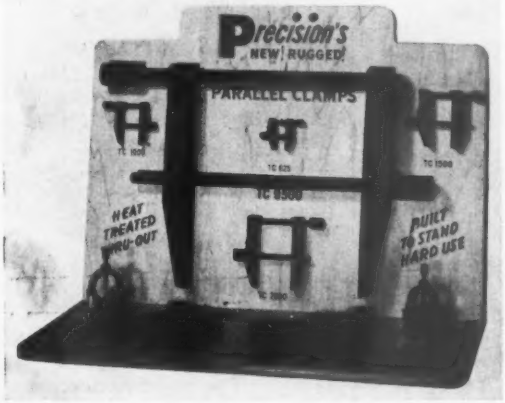
This New Carbide Hand File will be on display by Severance Tool Industries, Inc., 730 Iowa St., Saginaw, Mich., in Booth 813. Complete information and prices is obtainable.
Inform-A-Gram No. A65.

Profiling Tools. They have horizontally-clamped triangular inserts seated in a triangular slot to withstand side thrust when cutting left to right. A typical application on a New Britain Fischer



copying lathe is shown. Further data can be obtained from Kennametal, Inc., Latrobe, Pa., the display will be in Booth 1627.
Circle Inform-A-Gram No. A66.

Parallel Clamps. All the different types pictured will be in Booth 114. They are manufactured by the Precision Tool & Mfg. Co., 1305 S. Laramie



Ave., Cicero 50, Ill. If you don't get to the show, write direct to the company for further data, or—
Circle Inform-A-Gram No. A67.

fact:

nothing in the world is as hard as a

diamond

FACT: *in grinding carbides* — nothing cuts as fast, as cool and as economically as a diamond wheel.
FACT: *in drilling* — diamond bits give lowest cost per foot in hard geological formations.
FACT: *in dressing grinding wheels* only diamond dressers will do the job where fine finish, high production or intricate forms are involved.
FACT: *in wire drawing* — diamond dies assure accurate sizing, bright finish and high output.
FACT: *in lapping* — diamond compounds and powders save countless skilled man-hours by producing wanted sizes and finishes faster.
FACT: *in cutting* — diamond cutting and boring tools are standard for tough jobs where the best of competitive materials fail.
FACT: *in sawing* — diamond saw blades feature speed and economy on quartz, concrete, stone, sapphire, glass and diamond.
FACT: **Diamond Tooling gives you precise production, more production, uninterrupted production, *lowest cost production.***

IT IS A FACT . . . THERE IS NO ECONOMIC SUBSTITUTE FOR DIAMONDS

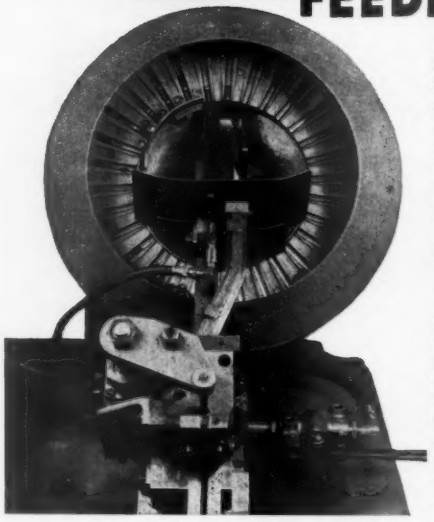
News Note: there is not a shortage of industrial diamonds. Learn the detailed facts about this wonder material. Write today for specific information and free booklet, "The Diamond That Pays For Itself."

IDA — 75 MEMBER COMPANIES Cooperating with Industry — INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, INC.

INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA, Inc.
124 East 40th Street, New York 16, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 129

Use DPS SELECTIVE FEEDING DEVICES



● Note the improvement in Lower Costs, Speedy Production, Quality Control and Increased Profits . . . Now, this DPS contribution to the metal-working industry is emphasized in an expanded line of selective feeding devices and engineering service . . . Tell us your requirements; we have the unit and the know-how to meet your needs.

DPS BARREL-FEEDER

● Here is an interesting case showing separate screws and lock washers that were loaded into a single feeder and ejected loosely assembled at the rate of 60 to 70 a minute . . . An amazing speed increase over slow, manual operation. In this instance, as in thousands of other applications, the unit was designed with the idea of maximum feeding of a wide variety of parts at a fraction of the cost of manual feeding.

DPS BOWL-FEEDER

Our Newest Addition

● An electric, vibrating unit that advances the parts on a circular spiral, aligning and correctly locating them to issue directly into the work area in proper time cycle. Provides fully automatic feeding of light, fragile parts that normally could not withstand tumbling.

Let us diagnose your symptoms and prescribe the proper remedy. Write for details.

DETROIT POWER SCREWDRIVER CO.

2827 W. FORT ST. DETROIT 16, MICH.

VISIT OUR BOOTH NO. 145, A. S. T. E. SHOW, PHILADELPHIA, APRIL 26 TO 30

CIRCLE INFORM-A-GRAM KEY NO. 130

. . . Stampings, from page 102

psi pressure supplied by a five to one hydraulic booster, is flange mounted on the bottom side of the die table. This cylinder has its piston rod in a vertical position extending downward toward the base of the press.

The hydraulic cylinder imparts vertical motion to the upper die platen through four widely spaced rods that are guided in individual bronze bushings in the press table.

Vertical die travel is limited only by the stroke of the cylinder. Variable shut height adjustments are made by turning spanner nuts on the threaded ends of the four actuating guide rods.

Auxiliary hydraulic cylinders for controlling extrusion, forming or drawing operations can be mounted on top of the platen or on plates with fabricated bases on any of three sides of the die.

Press Operation

The Hill inverted hydraulic press illustrated extrudes tubular ferrous and non-ferrous parts on radii considerably less than the tube diameter and up to 180° without wall thickness variations. Upset and forming operations can also be performed simultaneously with the extrusion operation if required.

Individual straight pieces of metal tubing are placed in the lower die and dual pushbutton cycle controls are actuated by the operator. The press then goes through an automatic operating cycle. The dies close, the auxiliary cylinder, or cylinders, at various locations on the machine extrude the tube to the desired form, and the dies open. The finished elbow is removed and the machine is ready to produce another part.

Release of pressure on either or both pushbutton controls during the cycle before die closure causes the upper die to immediately retract to upper position where it remains until the buttons are both simultaneously depressed. This feature provides maximum operator safety.

Press Specifications

The inverted press shown has a die area 20″ by 24″. Die travel is 6″ and maximum open height is 27″. The main hydraulic cylinder in the base of the machine is rated at 100 tons. The auxiliary cylinder is rated at 75 tons.

. . . *Continued on page 132*

Rx FOR COMPLEX STAMPING AND PRODUCTION HEADACHES

EFFICIENT *Tooling*

● A good prescription for your "tough", troublesome stamping problems . . . is EFFICIENT TOOLING. You can eliminate production headaches—simplify your stamping operations—reduce production costs—with ingenious well-constructed dies and tools by EFFICIENT.

Our organization has the know-how, the experience, the engineering skill to tool your most complicated parts to your best advantage.

Our large modern plant has complete machine facilities to meet your requirements. Our up-to-the-minute equipment includes tryout presses up to 300 tons capacity. Sample parts are delivered for your approval before dies are shipped to you.

Consult us on your tooling problems or write for full information.

ABOVE: Typical tooling job is the Cam Flange Die shown above. This is an adjustable die to cam flange both sides of three different sizes of range tops with one stroke of the press for each top.

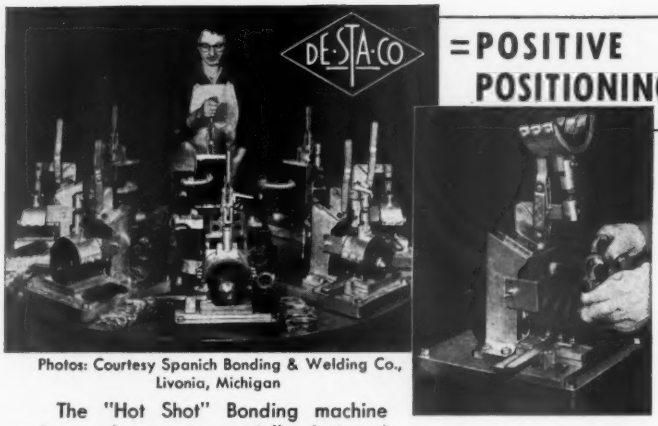
LEFT: Showing work done on a typical job—using a 28" x 96" Cincinnati Vertical Hydro-Tel, with automatic tracer and depth control.

Designers and Builders of Dies, Tools, Jigs, Fixtures and Special Machines

EFFICIENT TOOLING & PRODUCTION ECONOMICAL

THE **EFFICIENT** TOOL & DIE COMPANY

9314 ELIZABETH AVENUE · CLEVELAND 5, OHIO · PHONE Diamond 1-5150



Photos: Courtesy Spanich Bonding & Welding Co., Livonia, Michigan

The "Hot Shot" Bonding machine shown above was specially designed for the production department of one of the largest manufacturers of electrical appliances when previous methods of processing their parts proved unsuccessful. The positive clamping action of eight Model 340 De•Sta•Co Heavy Duty Toggle Clamps now enables one operator to produce 3840 completed brake-shoes per 8-hour work day. Fast acting De•Sta•Co clamps hold parts firmly together during the 550° F. bonding operation.

There's a De•Sta•Co Toggle Clamp engineered for any of your work-holding problems in assembly, bonding, welding, machining or inspection. Select from over 40 fixture and portable models. Positive holding pressures up to 4,000 pounds. Write today for a copy of the De•Sta•Co catalog describing available stationary and portable toggle clamps.

DE·STA·CO DETROIT STAMPING COMPANY
344 MIDLAND AVE. • DETROIT 3, MICHIGAN
SEE US AT TOOL SHOW, BOOTH 440, PRECISION HALL
CIRCLE INFORM-A-GRAM KEY NO. 132A

"And so, gentlemen, instead of building the additional plant, we'll just switch to Columbia Tool Steels."

COLUMBIA TOOL STEEL COMPANY • CHICAGO HEIGHTS, ILL.
Producers of fine tool steels — All types immediately available through Sales Offices, Warehouses and Representatives in Principal Cities.

TOOL COLUMBIA STEELS

CIRCLE INFORM-A-GRAM KEY NO. 132B

. . . Stampings, from page 130

Hydraulic pressure to operate the press is supplied by a separate Hill No. 4 hydraulic power pack. This motor, pump and tank unit has a 20-hp motor and a 30 gpm, 1000 psi pump. A pressure of 5,000 psi at the cylinder is provided by boosters located close to the cylinder to reduce length of high pressure lines to a minimum. Fitting resisting pressures up to 20,000 psi are provided in the high pressure line for safety.

If You "Can't" Go Down Go Up

The Saint Joseph, Michigan plant of the Auto Specialties Manufacturing Company, a large manufacturer of parts used in automobiles and tractors, was faced with the problem of positioning a Lindberg electric conveyor atmosphere hardening furnace. Since this plant is located on sandy soil just off the shores of Lake Michigan, water would be encountered if a pit was dug for the quench tank. In addition, mobility was desired to allow for subsequent repositioning of the unit if the need arose.

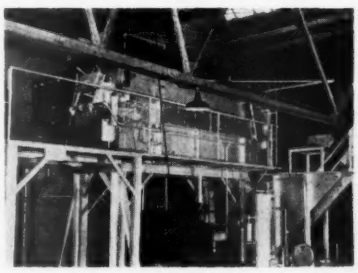


Photo courtesy Lindberg Engineering Co.

Their practical solution was to place the 17,400 lb. furnace on an inexpensive scaffold that could quickly be dismantled. Large containers holding the work to be treated are hoisted to the loading platform by a lift truck where the operator shovels the workpieces into the furnace. After treatment, the work drops from the conveyor belt into the quench tank where a flight conveyor drops it into a steel chute leading to tempering baskets. This solution also lends itself to space savings since atmosphere generators, control panels, etc., can be placed under the scaffold

A fastening is no better than the nut that locks it . . .

Use GRIPCO LOCK NUTS

for greater holding power in all your assemblies

Extra holding power need not add to the cost of any assembly. Gripco Lock Nuts are of one-piece design—thus low in initial cost. Their faster application reduces production costs, their greater holding power reduces mechanical wear and failures, which means longer product life for greater customer satisfaction. The Gripco Lock Nut, with triangular depressions on its top, provides frictional resistance to vibration and permits repeated removal and reapplication. The locking action is produced by a simple, vertical thread deflection, inherent in the nut itself—the same design that has held threaded fasteners tighter for over 50 years. If stress, wear or vibration poses a fastening problem for your products, see how a Gripco Lock Nut can give you a tighter hold, longer wear. Impervious to oil or water. Write for samples and full particulars.

GRIPCO PRODUCTS INCLUDE:

Gripco Lock Nuts, New Gripco "Clinch" Nuts, Gripco Hi-Nuts, Gripco Pilot-Projection and Countersunk Weld Nuts with or without Gripco locking feature.

102

GRIP NUT COMPANY

"after 50 years still holding strong"

308-W S. MICHIGAN AVE., CHICAGO 4, ILL.

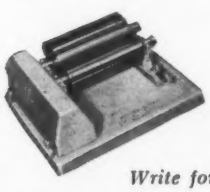
CIRCLE INFORM-A-GRAM KEY NO. 133A

Announcing

the NEW 24 inch SPITFIRE FLAT LAPPING MACHINE

LOW COST PRECISION LAPPING AT PRODUCTION SPEED

A NEW, large size Flat Lapping Machine of improved design for precision lapping of any material where a perfectly flat surface is necessary. Extremely close tolerance finishes are possible. An ideal machine for producing mating surfaces of sliding and rotating parts of air and liquid tight seals, plastic and die casting molds.



SPITFIRE ROLLER LAPPING MACHINE

For lapping cylinders to accurate, mirror-like finishes in less time than any other method. Saves up to ⅔ time in lapping.

Write for Brochures, Prices and Delivery

SPITFIRE TOOL COMPANY

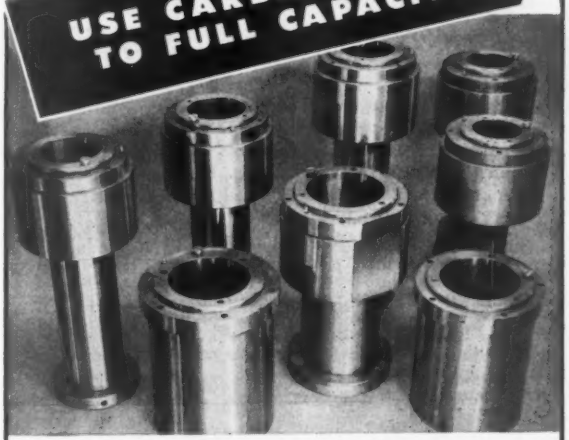
2935 N. Pulaski Rd. Chicago 41, Ill.

CIRCLE INFORM-A-GRAM KEY NO. 133B

Jergens

LIVE BUSHINGS

USE CARBIDE TOOLS TO FULL CAPACITY



INCREASE PRODUCTION—LOWER COSTS ON YOUR PRESENT EQUIPMENT

Illustrated above are a group of Jergens Live Roller Bearing Bushings with and without adapters designed to bring machine tools up to competitive levels. The Live Bushings illustrated above replace the bronze bearings in the column supports of various sizes and makes of Boring Mills. Utilizing two sets of absolutely sealed, adjustable, precision tapered roller bearings—these Jergens Live Bushings insure such constant rigidity and high precision that they permit the use of carbide tools to their full capacity giving heavier cuts at higher speeds with greater precision and longer tool life.

The liners of Jergens Live Bushings rotate with the bars preventing scoring and wearing of expensive boring bars. Every Jergens Live Bushing is made to the maximum bar capacity of the boring mill and can be easily "bushed-down" for precision adaption to any smaller size bar or combination of bars.

PERFORMANCE FEATURES

- Provides absolute seal against coolants, grit and dust
- Greater overall length increases accuracy and bushing life
- Needle Bearings fill applications requiring closer center distances
- Bearings can be taken apart without removing housing
- Cartridge-type bearing holder provides greater accuracy
- Protects against thrust loads as well as radial
- Tapered bearings can be adjusted to compensate for wear
- Adaptable to receive removable slip bushings, keys or keyways

Write for Complete Catalog

J. G. JERGENS CO.

Division of Donley Products, Inc.

Dept. TP-4

11106 Avon Ave. - Cleveland 5, Ohio

CIRCLE INFORM-A-GRAM KEY NO. 133C

Which of these 22 tube steels will give you maximum tube life per dollar? *Ask the experts!*

This month's report is on: **2% CR.-MO.**

Has intermediate corrosion resistance in combination with good creep strength and fair resistance to oxidation. For use at temperatures up to 1200° F. in cracking coils, reforming units, heat exchangers, vapor line and hot oil piping, and return-bend forgings for oil heaters.

ONE OF 24 TIMKEN HIGH TEMPERATURE STEELS

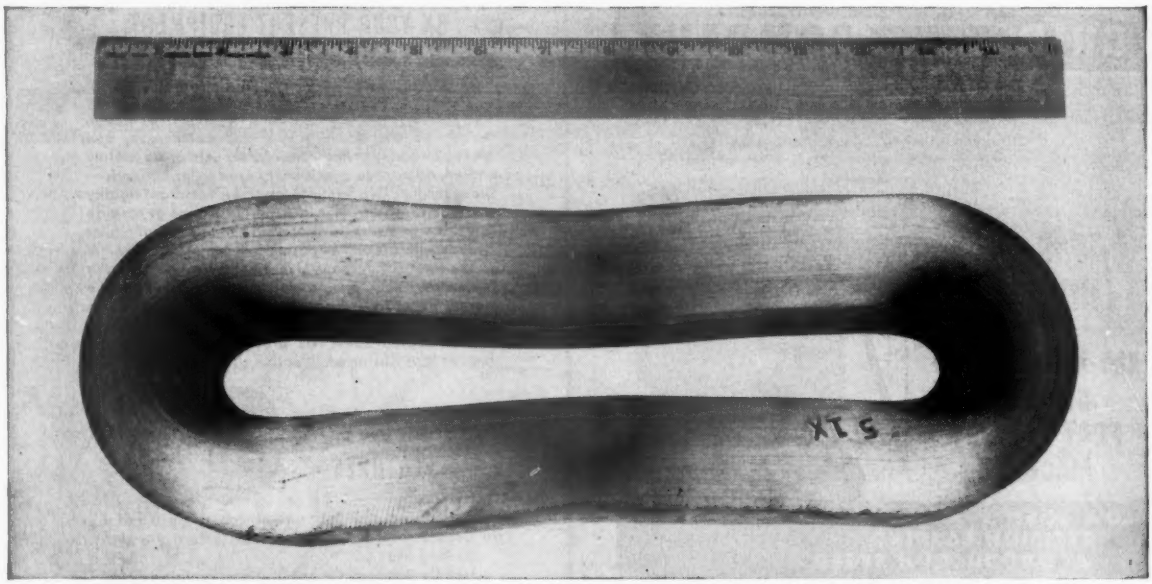
Carbon	Sicromo 2	Sicromo 5S	18-8 Ti
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	16-13-3
DM-2	2½% Cr.-1% Mo.	Sicromo 7	25-20*
Silmo	Sicromo 3	Sicromo 9M	25-12*
DM	4-6% Cr.-Mo.	18-8 Stainless	35-15**
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	16-25-6**

** Available as seamless tubing on an experimental basis only.*
***Not available as seamless tubing.*

FOR every high temperature application, there's one tube steel that gives you the best life-cost ratio. One steel best answers your particular set of temperature-pressure-corrosion-oxidation conditions. That's why the Timken Company makes the 24 different high temperature steels shown in the box at left.

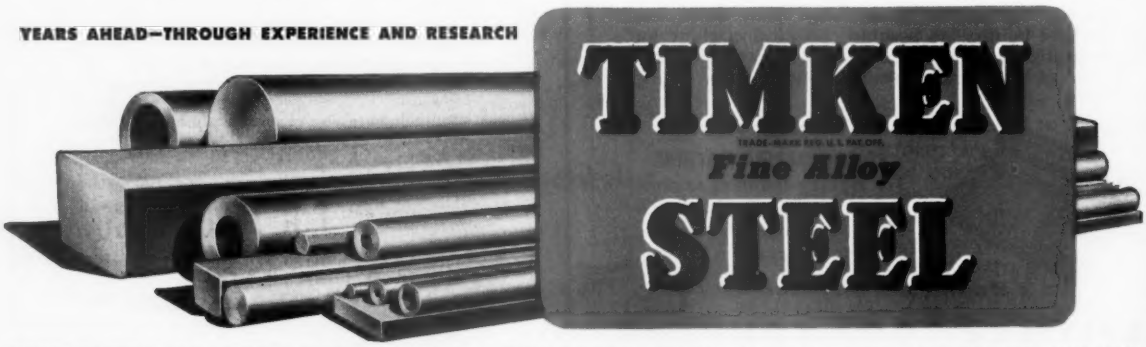
To find the one best steel for each of your applications, ask the Timken Company metallurgists. They're experts. They know how to balance the various factors against cost—and recommend the analysis that gives you maximum tube life per dollar of cost. They've been doing it for 20 years. And remember—regardless of analysis, you get uniform quality in every Timken® tube because we rigidly control quality at every step from melt shop through final inspection.

Put our "RSQ"—Research, Supply, Quality—to work on *your* tube problems. *Ask the experts!* The Timken Roller Bearing Company, Steel & Tube Division, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



Flattened test of 10½" O.D. by 1.580" wall of 18-8 Cb showing the excellent ductility of large, heavy-wall Timken seamless tubing.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

CIRCLE INFORM-A-GRAM KEY NO. 134

— QUICK-PIC CATALOGS —

News and Views of Current Literature

LATHE CONVERTERS

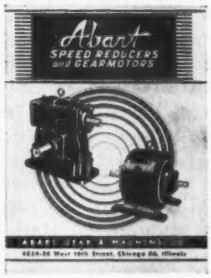
A lathe converter is a portable many-purpose motorized metal-working machine, with interchangeable heads or spindles to accomplish all types of machine shop operations. A well-illustrated brochure, yours for the asking, shows the machine in action. Write Master Mfg. Co., 1300 East Ave., Hutchinson, Kan., or—

Circle Inform-A-Gram No. E1

KNUCKLE PRESSES

A new catalog issued by the Verson Allsteel Press Co., 9300 S. Kenwood Ave., Chicago 19, Ill., gives design details and specifications on the complete line of Verson Knuckle presses for squeezing operations such as coining, embossing or sizing. If writing the company direct, ask for Bulletin No. K-53.

Circle Inform-A-Gram No. E2



SPEED REDUCERS

For the convenience of engineers, designers and draftsmen, Abart Gear & Machine Co., 4832 W. 16th St., Chicago 80, Ill., has made available a handy 96-page booklet that gives technical data on proper selection of speed reducers and gear motors. It includes information on torque ratings, ratios and installation.

Circle Inform-A-Gram No. E3

TOOLMAKERS' MICROSCOPE

This instrument is for use wherever precision measurements are required in shop inspection or layout procedures. It is presented particularly to those engaged in precision measurement. The booklet is available from The Gaertner Scientific Corp., 1201 Wrightwood Ave., Chicago 14, Ill.

Circle Inform-A-Gram No. E4

PRECISION GRINDING

This folder is jam-packed full of information on Harig's grind-all fixture which can be particularly applied to carbide grinding, but is readily adaptable to grinding of other shapes, inspection, light milling and radius dressing. For your copy, write to the Harig Mfg. Corp., 5751 W. Howard St., Chicago 31, Ill., or—

Circle Inform-A-Gram No. E5

DRILLING & TAPPING UNITS

Speed production! Eliminate unnecessary operations! Save time and labor costs! Improve products! This catalog tells you how. In its 24 pages is operational and application data on Hypneumat automatic drilling and tapping units. The booklet is offered by Hypneumat, Inc., 647 W. Virginia St., Milwaukee 4, Wis.

Circle Inform-A-Gram No. E6

DUST COLLECTORS

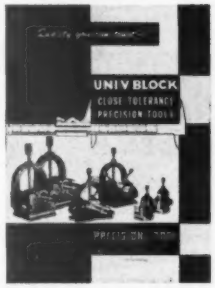
Here is an illustrated brochure that tells of a new individual dust collector for use on machines where grinding dust must be removed. The literature shows how the collector is used on various grinding machines. You can get a copy by writing The Vulcan Tool Co., 730 Lorain Ave., Dayton 10, Ohio, or—

Circle Inform-A-Gram No. E7

FORGING & CASTING

This catalog contains essential information about the products of the Forging and Casting Division of Allegheny Ludlum Steel Corp., Ferndale 20, Mich. The handbook outlines forged shapes available, stainless as well as tool steel and weight limits, as well as analyses. Diagrams of standard shapes are included.

Circle Inform-A-Gram No. E8



UNI-V-BLOCKS

This bulletin carries information on precision measuring blocks and parallel clamps made by the Precision Tool & Mfg. Co. of Illinois, 1305 So. Laramie Ave., Cicero 50, Ill. The brochure contains illustrations, specifications and dimensional drawings. Also included is a brief but comprehensive history of the firm.

Circle Inform-A-Gram No. E9

PROFILE GRINDER

Complete information on this grinder is contained in a circular now available from the Boyar-Schultz Corp., 2110 Walnut St., Chicago 12, Ill. Included are illustrations, drawings and specifications. This machine is essential for grinding difficult profiles in the toolroom and on the production line.

Circle Inform-A-Gram No. E10

Eighth Annual Convention American Society for Quality Control

The Eighth Annual Convention of the American Society for Quality Control will be held in St. Louis, Missouri on June 9, 10, 11, 1954. Headquarters for this convention will be the Jefferson Hotel. The Technical Sessions will be held at Kiel Auditorium.

The program will consist of 72 Sessions, which will include 67 Technical Sessions and 5 Sessions devoted to Plant Tours. The Chemical and Textile Divisions are participating as are the Aircraft, Automotive, Electronics, Metals, and Operations Research Committees. In addition, the more recently organized Business Operation Committee has a program, and a series will be presented by the Basic Research Committee.

There will be space for the largest number of exhibitors in the history of the Convention and most of it will be filled. There will be a Book Booth in the form of a spacious lounge with plenty of easychairs. Books on all phases of quality control and many related subjects will be on sale. Several authors are scheduled to be on hand.

Many social events are planned for the evenings, and for those who plan to bring their wives, a ladies' program has been arranged.

Registration blanks and further information may be obtained from:

Mr. U. C. Gramsch, Registrar
8th Annual A.S.Q.C. Convention
P. O. Box 4436, Wade Station
St. Louis 15, Missouri

JOHNSON BAND SAWS

SPECIFICATIONS
MODEL B

Capacity—5" rounds, 10" flats.
Height Overall—(Closed)—32".
Blade Length—7'5" x ½" x 23 ga.
Floor Space—46" x 28".
Weight—(Uncrated) 235 lbs. Crated 280 lbs. Boxed for Export 400 lbs.
Wheel Diameters—10".
Motor—⅓ H.P. any voltage available.
Speeds—45, 90 and 150 ft. per min.
Casters—Optional at slight extra cost.

MODEL J, 10" x 18" CAPACITY ALSO AVAILABLE
WRITE FOR DETAILS

JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 136

Unit Dust Collectors vs Central System

Because the selection of dust control equipment may be made by an owner of a small shop or the management of a large plant only "once in a lifetime" it is sometimes approached with reluctance.

An example of this is the installation of collectors to collect the dust from seven Cincinnati

Photo courtesy Aget-Detroit Co.

grinders in the shop of a leading producer of precision taps. The management of this shop refers to itself as a "job-shop". This means that the use of the seven grinders is on a strictly intermittent basis with the total usage throughout the day being completely unpredictable.

One single self-contained dust collector with cyclone separator and second stage filter to permit return of the cleaned air to the working space would have a conventional header pipe con-

nected to the inlet of the collector and have branches and vertical droppers to connect with the hood at each grinder.

The unit, "one-per-grinder" type of collector is likewise entirely self-contained in that each has its own cyclone separator and second stage filter.

The decision in favor of the unit type collectors was made however, chiefly on the point of the intermittent usage of the grinders: If only one single grinder were being used, the 7½ hp. motor of the single collector would be running. But in the case of the individual collectors only a 1/3 hp. motor would be "on". With all seven grinders in use, the electrical power required would be on the basis of 7½ hp. for the single system as compared with 2-1/3 hp. for the individual unit type collectors.

The possibility also existed that the arrangement of the grinders might someday be changed, or that more grinders would be added.

Ford Motor Experiments with Radioactive Ore

One of the largest quantities of radioactive material ever involved in an industrial experiment has been used by Ford Motor Company to trace the flow of iron ore through the white-hot heart of a blast furnace.

Seventy-six tons of radioactively "tagged" ore were fed into the "Benson Ford" blast furnace at the Ford Rouge plant in Dearborn, Mich. The test was conducted to determine the feasibility of using as part of the "charge" fine iron powders obtained by concentrating low-grade ore.

The steel industry has assumed it is necessary to form these powders into lumps because the powders are too light to withstand the draft of a blast furnace long enough to be smelted into iron. It was the first time radioactive tracers were used to test the need for this extra step in iron making.

Ford research men reported that while the tests showed a "surprisingly" large amount of the fine iron ore particles — or about 60 per cent—was retained during the smelting process, this was "somewhat too low" to make charging of such powders practicable.

The amount of material actually smelted into iron, compared with that expelled and trapped in the dust-collection system, was determined by checking the radio-activity of the pig iron, slag and expelled dust.

Despite the large amount of material involved in the test, the level of radioactivity was so slight it was completely harmless to personnel conducting the experiment. Radioactivity was 100 times below the level prescribed for safety by the AEC.

The test was conducted by personnel of Ford's Steel Division and the Ford Radioactive Isotopes Laboratory. Preparations began seven months ago when a five pound lot of powdered iron ore concentrate was welded inside an aluminum container and sent to the AEC at Oak Ridge, Tenn.

... Continued on page 152

MORTON
Fixture Clamps
AND COMPONENTS
MEET MORTON
BOOTH 113
A.S.T.E. SHOW
WRITE TODAY!
MORTON is recognized throughout the industry for the development and manufacture of the most economical and highest quality Fixture Clamps and Details, Jack Locks, Cam Locks, Hand Knobs, Hand Wheels, Steel Ball Handles, Soft Chuck Jaw Blanks, Fixture Cams, Alloy Set-up Studs, Rest
Spherical and Plain Color Nuts, Quarter Turn Screws
MORTON MACHINE WORKS

CIRCLE INFORM-A-GRAM KEY NO. 137

Purple Means Radiation Perils!

Safety for the man on the job is the purpose of the new American Standard Color Code, just revised and released to industry.

The American Standard Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment is the revision of a war standard. It uses three new colors needed to warn workers against potential dangers.

The recently-born radiation perils will be announced by high-visibility purple. This color was adopted into the Code from the Atomic Energy Commission, who employs the color in a broken-propeller-shaped symbol. The code suggests that purple be used in rooms and areas, indoors and outdoors, where radioactive materials are stored or handled. Burial grounds for this material and contaminated equipment are also marked by this color. Purple signal lights may be used to indicate when radiation-producing machines are in operation.

Two other colors added to the revised code are: Orange, will be used to designate dangerous parts of machines or energized equipment that may cut, crush, mangle or otherwise injure, and to emphasize dangers from exposed or unguarded parts of machines. Blue, long used as a signal by railroads, will warn employees not to attempt to operate machines while down or under repair.

"If a worker is to recognize these warnings, they must mean the same, whether he goes to work in a plant in Pittsburgh or repairs a machine in Dallas," stated Vice Admiral George F. Hussey, Jr., managing director of the American Standards Association. "This code is not intended to conflict with any safety measures in industry; on the contrary, it was designed by industry for approval as an American Standard to make these colors uniform throughout the country."

The revised edition of the War Standard is expanded in detail. It includes technical definitions so that the colors recommended can be reproduced and lists physical samples to aid in putting the recommendations into effect.

Still a part of the code are the long-used, nationally accepted:

RED for danger and fire

YELLOW for caution and physical hazards, such as striking against, falling, tripping, etc.

BLACK and WHITE for traffic — dead ends, stairways, directional signs — and housekeeping signs

GREEN for the location of safety equipment.

The American Standard Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment, Z53.1-1953, may be obtained from the American Standards Association, 70 East 45 Street, New York 17, N. Y., at 50c a copy.

"Doing a job" is right!

30% decreased grinding time, grinding costs way down, less operator fatigue, greater wheel life, increased production.

* Here's what the Tool Room Superintendent at the Tool Steel Gear and Pinion Co., Cincinnati, Ohio says:

"Since installation this Standard Tool Grinder has had no downtime . . . required no maintenance other than routine. We use the machine daily, sometimes continuously on production wet-grinding of carbide tipped hub-turning, offset turning, boring and other high-speed steel tools. It's by far the best precision grinder we've used."

Outstanding performance? No . . . just typical of the Standard Twin Wheel Tool Grinder. Available in 10" and 14" wheel sizes; wet or dry. No spray or splash when wet-grinding. Two operators can grind at once. Conserves floor space. Write for Bulletin TW today for full details.

Patent Pending

Standardize with the STANDARD electrical tool co.

See us in Booth 538 ASTE show Philadelphia, April 26-30

MT. HOPE & SIXTH STS. • CINCINNATI 4 • OHIO

CIRCLE INFORM-A-GRAM KEY NO. 138

For Your Future

U. S. SAVINGS BONDS

Hints on Babbitting Practice

A large proportion of machinery relies on babbitted bearings for efficient operation. Bearing failures can cause machinery damage and can lead to even greater losses in downtime.

If the basic steps outlined here are carefully followed, downtime will be markedly reduced, repair costs minimized, and production will proceed more smoothly.

Common Causes of Bearing Failures

(1) In the bearing metal itself: the selection of the wrong bearing metal for the job at hand.

(2) In the making of bearings: improper bond between the liner and the shell, porosity of the liner, segregation of the constituents in the liner, hard spots which cause scoring of the shaft.

(3) In the installation of bearings: presence of foreign particles, such as dirt or metal chips, causing scoring or seizing of the shaft, insufficient or excessive clearance, misalignment of the shaft.

(4) In the operation and maintenance of bearings, use of improper lubricants, failure to filter foreign particles from lubricants, overloading or over-speeding of the equipment, corrosion due to overheating of lubricant, corrosion due to dilution of lubricant with acidic compounds or water, fatigue caused by high local compressive stresses and high local bonding stresses.

Suggestions for Preventing Bearing Failures

Select the proper bearing metal. The recommendation of the equipment supplier or a reputable manufacturer of bearing alloys should be sought and followed. Generally speaking, tin base babbitts are best for high speeds and heavy-duty service . . . lead-base babbitts for medium or low speeds and loads. In making bearings, (melting), make sure that the melting pot is clean, heat the kettle uniformly to prevent segregation, stir the molten metal thoroughly by using a long-handled steel rod with a perforated steel plate attached, control metal temperature with a pyrometer, do not allow the metal to cool while in the pot, or to stand overnight. Segregation will usually occur. Do not add drosses, sweepings, or skimmings. They usually contain detrimental impurities. The safest, and the least expensive procedure is to return all these materials to a reputable smelter for refining.

In bonding, machine the shell surface to a "phonograph" finish, avoid use of lubricant when taking the final cut, degrease in a commercial alkaline cleaner held just below its boiling-point, etch for three to five minutes in an aqueous solution of 50% hydrochloric (muriatic) acid held at 160°F. — 180°F., if not clean, repeat degreasing and etching. Dip into flux held at a temperature of 150°F. A saturated solution of two parts of zinc chloride and one part of ammonium chloride in water is usually satisfactory. Dip the shell into a bath of molten bonding alloy (tinner's solder) kept about 150°F. above its

. . . Continued on page 150

COMBINED OPERATIONS...
CUT COSTS..
MOHAWK
SUBLAND
DRILLS
2 to 11 Operations
Simultaneously Accomplished

In one typical example, costs were cut with Mohawk Subland Drills from 34c per hundred holes to 9c per hundred holes (including original tool, labor and resharpening costs). Mohawk perfected the Subland design for producing multiple diameter cavities. *Properly applied*, a Subland can accomplish 2 to 11 operations at one time. You can drill, counterbore and spot face as shown. The Mohawk Subland eliminates excessive torque in roughing tapered holes, lengthening tool life by as much as ten times (See May issue). Send part print, tool layout, shank and over-all length requirements for prints and prices. Let Mohawk cut your production costs with *properly applied* Sublands.

SUBLAND DRILL (2-2-2)
which will (1) drill, (2) counterbore and (3) spot-face a cavity in one operation.

Mohawk TOOLS, Inc.
910 E. MAIN ST., MONTPELIER, OHIO

SEE YOU AT BOOTH 1003
A.S.T.E. SHOW

world's largest producer of Sublands

CIRCLE INFORM-A-GRAM KEY NO. 139

Keep Informed • CATALOGS BULLETINS • SPECIFICATIONS

PUBLICATION

For Ease and Convenience Use TOOLING and PRODUCTION Inform-A-Gram Cards

Opposed Spindle Drilling Machines are the subject of this bulletin now available from Walter P. Hill, Inc., 22183 Telegraph Rd., Detroit 19, Mich. Operating descriptions, application data and machine specifications are given.
Circle Inform-A-Gram No. B1.

Approach to Cost Reduction. This 20-page booklet shows how job engineered cylindrical grinders assure a high return on machine investment. Included is a discussion of the economics of low cost production and the Landis plan to reduce present high costs. Pictures and sketches also are included. Write to the Landis Tool Co., Waynesboro, Pa., or—
Circle Inform-A-Gram No. B2.

Precision Nylon Balls. A bulletin available from the Industrial Division, Ace Plastic Co., 91-30 Van Wyck Blvd., Jamaica 2, N. Y., gives complete information on Nylon balls for valves, valve components, specialized anti-friction bearings, detents, mechanical checks and other industrial applications.
Circle Inform-A-Gram No. B3.

Hack Sawing Machine. A new 16-page brochure covering the revised Peerless Mechani-Cut hack sawing machine is now available from the Peerless Machine Co., Racine, Wis. Also included in the booklet is a section on conveyors used in conjunction with the saws and a handy chart showing recommended operating factors.
Circle Inform-A-Gram No. B4.

Metallic Abrasives are well described in a 16-page, two-color, illustrated catalog just published by the Cleveland Metal Abrasive Co., 887 E. 67th St., Cleveland, Ohio. The brochure contains information on how to select the correct abrasive and has an abrasive consumption chart. Complete and detailed SAE specification charts also are presented.
Circle Inform-A-Gram No. B5.

Straightening Press. A new vertical hydraulic straightening press with rapid advance, power pressing and rapid return stroke is now being manufactured by the American Broach and Machine Co., Ann Arbor, Mich. In 75, 100 and 150-ton capacities, the machine can be supplied with large dial-type pressure gage and remote control adjustments for relief valve setting. Literature will be gladly furnished.
Circle Inform-A-Gram No. B6.

Zincilate, a new conception of protective coating, is described in a brochure published by Industrial Metal Protectives, Inc., 405 Homestead Ave., Dayton 8, Ohio. The literature contains complete information on this self-protecting coating and illustrates several typical applications in varied fields.
Circle Inform-A-Gram No. B7.

A Rugged Index Table designed for use in presses, drilling machines, tapping machines, assembly machines, spinners and power screwdrivers is the air-operated Model PDC-AM14 made by the Precision Detroit Co., 20100 Sherwood Ave., Detroit 34, Mich. Features of the machine are given in a brochure now available. **Inform-A-Gram No. B8.**

The BD is the preferred hub-type wheel for heavier stock removal. Ideal for smoothing and blending welds on fabricated work; smoothing flame-cut edges and stainless steel welds; cleaning between teeth of gear castings; many slotting, notching and cutting-off operations.

4 Great Team-Mates for your "TOUCH of GOLD"

Norton REINFORCED WHEELS add value, cut costs, on hundreds of grinding jobs

Here's the Line-Up

BD Rigid hub-type, resinoid bonded. Glass cloth reinforcement for high strength, plus the Nylon layer add up to extra hub-wheel safety. For the more severe jobs on your right angle grinders.

BFR Semi-flexible hub-type, resinoid bonded. Cotton fabric reinforcement with the additional layer of Nylon. For better finish and contour blending.

BF Semi-flexible straight wheel, resinoid bonded. Cotton fabric construction similar to the BFR, but without Nylon reinforcement. For periphery grinding only. An excellent deburring and finishing wheel. Also available in mounted wheels and points and in hand sticks.

BN Straight wheel, resinoid bonded. Glass cloth reinforcement, in the BD. Provides very high resistance to breakage in a wide range of cutting-off and other jobs.

Add outstanding versatility to strength and to safety, multiply the result by four and you have one reason why this Norton team rates as the "Big 4" among reinforced wheels.

Separately, each handles a considerable number of important grinding jobs. Together, they cover an almost endless list of applications, ranging from light deburring to severe cutting-off. And they do every one of these jobs with the *extra* safety, service life and economy that add the real "Touch of Gold" to your grinding operations.

Your Norton Distributor
will be glad to demonstrate Norton Reinforced Wheels in your shop, and to aid you in any grinding problem. Or write to NORTON COMPANY, Worcester 6, Mass. for the Brand New Catalog on Reinforced Wheels. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. W-1552

CIRCLE INFORM-A-GRAM KEY NO. 140

PREVIEWS

Circle postage-free Inform-A-Gram Key Number for your request

TOOLING and PRODUCTION'S Inform-A-Gram Section is a CARDload of Information

Die Casting Machines. The ink on this brochure may still be wet when you receive it—it is that new. The bulletin describes the Model 50 and Model 100 Cleveland Die Casting Machines. It includes illustrations and specifications and is available from The Cleveland Automatic Machine Co., Cincinnati 12, Ohio.
Circle Inform-A-Gram No. B9.

Foundry & Machine Shop facilities available on a contract basis are illustrated and described in a 32-page catalog offered by the Franklin Balmar Corp., Woodberry, Baltimore 11, Md. Illustrations show many of the different types of casting and machine shop products the firm has completed.
Circle Inform-A-Gram No. B10.

Application of Industrial Diamonds throughout all segments of industry is featured in a publication available from the Industrial Diamond Association of America, Inc., 124 E. 40th St., New York 16, N. Y. Sections of this booklet on diamond dies, drill bits, diamond turning and boring tools and diamond grinding of tungsten carbide will be of particular interest to the metalworking field.
Circle Inform-A-Gram No. B11.

Molding Machines. A new catalog, "Let's Look at the Herman Line of Molding Machines," has been published by the Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh, Pa. Prominently displayed and explained are Herman 750 and 1500 lb. jolt rollover machines; vertical hydro-centrifugal casting machines and indexing machines.
Circle Inform-A-Gram No. B12.

Precision Tracer Templates. A new, economical and rapid method of producing tracer templates for use with all types of profile tracing machine tools, has been reported by the Template Reproduction and Engineering Co., 401 N. Broad St., Philadelphia 8, Pa. Details and complete information will be supplied by the firm promptly upon request.
Circle Inform-A-Gram No. B13.

For Gaging Threads. Here is a recently published catalog (No. 612) which describes both the Taft-Peirce Bench Model and Shaft Model power thread gaging units as well as listing the various collets and adaptors available. Write to The Taft-Peirce Co., Woonsocket, R. I., or—
Circle Inform-A-Gram No. B14.

Laminated Parallels & "V" Blocks for magnetic chucks that speed up grinding setups are illustrated and described in literature now available from the Grover-Sayle Co., 8205 Clinton Rd., Cleveland 9, Ohio.
Circle Inform-A-Gram No. B15.

Material Handling Booklet. This brochure illustrates and describes the entire line of containers made for the metalworking industry by the Union Metal Mfg. Co., Department MH-611, Canton, Ohio. Two full pages, illustrated with photographs and drawings, show how Work-O-Matic units are used to work-position, dump, store, collect and transfer a variety of materials. If writing the company direct, ask for Bulletin MH-811.
Circle Inform-A-Gram No. B16.

The BFR is outstanding for light snagging, light weld grinding, smooth finishing, blending contours and corners, removing mold marks, removing rust and scale, and scarfing and beveling before welding. Also for notching gates and risers.

The BN is the recommended cut-off wheel wherever great strength and safety are vital. Excels at cutting-off non-ferrous gates and risers and various non-metals. Its range also includes cutting wire rope, slotting rails, tuck pointing, etc. Small sizes are popular on small portable grinders.

NORTON
ABRASIVES
Making better products... to make other products better

The BF Semi-Flexible, a straight wheel version of the BFR, is the wheel to use for light deburring, breaking edges on machined work, taking off flash from plastic parts, removing light welds and many other miscellaneous light portable and bench grinding applications.

BF Mounted Wheels and Points, like all Norton mounted wheels and points, are trued on their own spindles. Having the same laminated construction as the larger BF wheels, they are designed for such jobs as finishing plastic molds, glass molds, forging dies, etc. For hand finishing, use BF sticks.

CIRCLE INFORM-A-GRAM KEY NO. 140

Bending Rolls are illustrated and described in the brochure (Bulletin No. 352-C) offered by the Buffalo Forge Co., P. O. Box 985, Buffalo 5, N. Y. The booklet contains illustrations and specifications on several types of Buffalo bending rolls.
Circle Inform-A-Gram No. B17.

A New Conveyor Catalog of 36 colorful illustrated pages shows light, medium and heavy duty roller conveyors, frames, frogs, curves and switches. It is available from Samuel Olson Mfg. Co., Inc., 2423-27 Bloomingdale Ave., Chicago 47, Ill.
Circle Inform-A-Gram No. B18.

Watchmakers' Lathes. A complete set of literature on fine watchmaker and jeweler lathes is available from the C. & E. Marshall Co., 1445 W. Jackson Blvd., Chicago 80, Ill.
Circle Inform-A-Gram No. B19.

Thread Repair Bulletin. Maintenance engineers should find of interest and value Bulletin No. 654 on how stripped or worn threads can be repaired quickly and permanently by Heli-Coil screw thread inserts. The bulletin can be had from the Heli-Coil Corp., 1467 Shelter Rock Lane, Danbury, Conn.
Circle Inform-A-Gram No. B20.

SHELDON
CHICAGO U. S. A.

OFTEN PAYS OUT ON THE FIRST JOB...
and gives additional years of "cost free" service.

In the past, lathes were generally bought as large and as heavy as possible to insure accuracy and sufficient power. Now, with accurate, low-cost Sheldon Precision lathes, it is more profitable to buy these faster, cost-cutting lathes for the specific job at hand just as you would buy jigs and fixtures.

In savings of tooling costs, operator cost, power cost, and plant loading, as well as extra profits from more pieces per hour, Sheldon lathes often pay back their cost on a single run.

Sheldon lathes will work to the closest tolerances — have "Zero Precision" Taper Roller Bearings. They can take a healthy cut when operating at high speed direct drive — have double V-belts to the spindle. They will swing 10", 11" or 13" and have a 1⅜" hole through the spindle—have sufficient capacity for the great bulk of lathe work. Sheldon lathes have created a new factor for figuring machinery costs. They are tools you should know about.

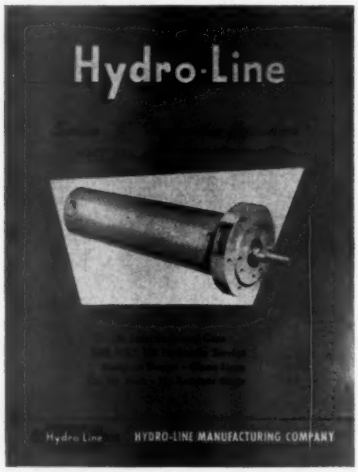
Write for Catalog

SHELDON MACHINE CO., INC.
4235 N. Knox Ave. Chicago 41, Illinois

Be sure to see this and other SHELDON Machine Tools in operation at ASTE Show, Philadelphia. Booths 810-12.

CIRCLE INFORM-A-GRAM KEY NO. 142

Hydraulic Cylinders. A complete description of the new series "J" hydraulic cylinders is given in this



8-page, 2-color catalog, recently issued by the Hydro-Line Mfg. Co., 5769 Pike Rd., Rockford, Ill.
Circle Inform-A-Gram No. B21.

Fast Action Clamps for all types of metal work developed by the Hallwell Tool Co., 606 S. Hill St., Los Angeles 14, Calif., are illustrated and described in a folder now available from the firm. Specifications are included.
Circle Inform-A-Gram No. B22.

Index Automatic Screw Machines. Catalogs providing information concerning the three types of Index automatic screw machines produced by the Wickman Products Corp., 10325 Capital Ave., Oak Park, Detroit 37, Mich. now are available. These machines have been developed for economical manufacture of components with short cycle times which do not require turret tools.
Circle Inform-A-Gram No. B23.

Conveyors. Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill., has announced an augmented line of piano-hinged apron conveyors in three pan types, four chain pitches and four basic assemblies, designed to meet a wide variety of conveyor applications. Information is provided in the firm's Folder 2470, a copy of which will be furnished upon request.
Circle Inform-A-Gram No. B24.

American Standard Perforators are designed to meet the exacting demands of modern die engineering and die making by supplying a wide range in selecting punches to suit hole diameters and spacing variations. Literature that gives specifications and dimensions of the perforators is available from American Standard Perforators, 4878 W. Grand Ave., Chicago 39, Ill.
Circle Inform-A-Gram No. B25.

The Model 553 Vibration Analyzer permits selective readings of a steady state vibration phenomena from as many as six points on a device or machine under test, and while it is operating under any simulated circumstance of load or speed. A brochure on this instrument is available from the International Research and Development Corp., 168 East Hosack St., Columbus, Ohio.
Circle Inform-A-Gram No. B26.

Collecting Cast Iron Dust with a standard Dustkop dust collector is illustrated and described in Bulletin 640 No. 1, issued by the Aget-Detroit Co., 213 Main St., Ann Arbor, Mich. The bulletin briefly analyzes the problem, relates the steps taken in selecting and installing the equipment and gives the cost of the entire installation as well.
Circle Inform-A-Gram No. B27.

Rolling Mills. E. W. Bliss Co., Rolling Mill Division, Salem, Ohio, has revised and expanded its brochure on rolling mills and accessory equipment. The new 60-page booklet contains a variety of photographs and data on mill equipment for the steel, brass and aluminum industries. Engineering tables and charts are included. **Inform-A-Gram No. B28.**

Delpark Coolant Filters. A new bulletin describing Delpark coolant filters for use on Cincinnati precision grinding machines is now available. The folder covers the advantages of Delpark filtration in savings of tools, machine productive time, maintenance costs and increased accuracy. For your copy write to the Industrial Filtration Co., Dept. C 299, Lebanon, Ind., or— **Inform-A-Gram No. B29.**

More than a half-century of changing trends and continuous machinery advancement are well-illustrated in a comparison of the more cumbersome, pioneering machines shown in

a booklet issued by Kling Bros. Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill., at the "turn of the century" and the multi-purpose, streamlined design exemplified in the Combination Machine pictured in the latest Kling bulletin.
Circle Inform-A-Gram No. B30.

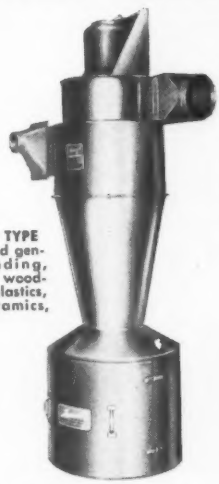
Circularity Grinding Attachment. Literature on this device is available from the Detroit Reamer & Tool Co., 2830 E. Seven Mile Rd., Detroit, Mich.
Circle Inform-A-Gram No. B31.

The Lathemaster is a four-faced tool block with five basic tool holders which will accommodate all lathe tools and may be fitted easily and quickly to any engine lathe. Learn all about this new development by writing for the illustrated bulletin available from Marvic, Inc., San Mateo, Calif.
Circle Inform-A-Gram No. B32.

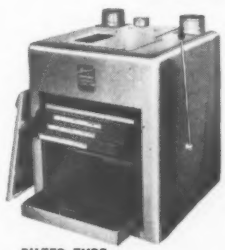
Surface Grinders. Here is a complete catalog of precision grinding machines manufactured by the Abrasive Machine Tool Co., 16 Dunnellen Rd., East Providence, R. I. It contains good illustrations and specifications.
Circle Inform-A-Gram No. B33.

Data Sheets on Alloy Steels are offered by Wheelock, Lovejoy & Co., 135 Sidney St., Cambridge 39, Mass. Included in the literature are S.A.E. and A.I.S.I. standard classifications, stock lists, basic prices, application guide and a hardness table.
Circle Inform-A-Gram No. B34.

THE costliest cutting tool IN YOUR PLANT-



CYCLONE TYPE for tool and general grinding, polishing, woodworking, plastics, glass, ceramics, etc.



FILTER TYPE for grinders, drills, lathes, surface grinders, etc.

No—it's not a tool of production—it's a tool of destruction! . . . it is ABRASIVE GRIT—by-product of your grinding, cutting and finishing operations.

Hammond DUSKOLECTORS

A *MUST* FOR *DUST!*

These units trap dangerous dust *before* it can harm the health and efficiency of your employees and damage valuable machinery . . . These two distinct types of Duskolectors offer the best and most economical solutions to your special dust problems. Hammond *experience* will help you too, in eliminating the dust menace . . . Write today for bulletin.

Hammond Machinery Builders INC

1031 Douglas Avenue • Kalamazoo, Michigan

Hammond OF KALAMAZOO GOOD MACHINERY SINCE 1915

"SEE THIS MACHINE IN OPERATION AT BOOTH 1303-ASTE SHOW"

CIRCLE INFORM-A-GRAM KEY NO. 143

Ball Bearing Die Sets. Lempco Products, Inc., Industrial Division, Dunham Rd., Bedford, Ohio, announces a new publication showing its line of ball bearing die sets.
Circle Inform-A-Gram No. B35.

Automatic Turret Lathe. The new Model 4-U Automatic Turret lathe manufactured by the Potter & Johnston Co., Pawtucket, R. I., is ably described in an illustrated brochure put out by the company. Included in the literature is data on new features of the machine and specifications.
Circle Inform-A-Gram No. B36.

Bronze Precision Bearings. The new Amplex catalog, "Standard Oilite Bearings," lists more than 700 bearings, cores, bars and plates carried in stock. Booklet is available from Amplex Oilite Products, P.O. Box 2718, Detroit 31, Mich.
Circle Inform-A-Gram No. B37.

Heavy-Duty Drill Chuck. The Albrecht keyless "Neverslip" heavy duty drill chuck is described in a bulletin available from the Microtrue Co., 149 Church St., New York 7, N. Y. Illustrations and specifications included.
Circle Inform-A-Gram No. B38.

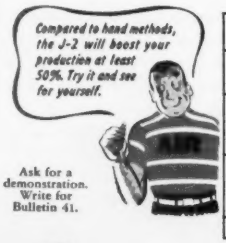
Speed up the job with the –

NEW ROTOR IMPACT WRENCH

FAST. Powerful air tool. 2100 solid blows per minute set nuts in a hurry. Reversible for removing nuts.

NON-FATIGUING. Weighs only 3 lbs. Well balanced. No stalling shock. No twist.

LOW MAINTENANCE. Fewer parts . . . some interchangeable . . . some reversible. Steel clutch housing. Rugged throughout.



Ask for a demonstration. Write for Bulletin 41.

SPECIFICATIONS

MODELS	Blows per Minute	Length	Weight	Square Drive*	Side to Center	Hose Connection	Rated Capacity, (Bolt Size)
J-2-S Side Handle	2100	6"	3#	½"	1⅛"	¼"	¼"
J-2-L Lever Handle	2100	7¾"	3¼#	½"	1⅛"	¼"	¼"

*½" square drive or ⅜" Quick-Change Chuck is optional.

CIRCLE INFORM-A-GRAM KEY NO. 144

Die Stamping of special wrenches and non-metallic materials is stressed in a brochure recently published by the Federal Tool & Mfg. Co., Dept. KP, B161, 3600 Alabama Ave., Minneapolis 16, Minn. The illustrated brochure provides information on special wrenches die stamped to specifications and phenolic resins, vulcanized fibres and plastics.
Circle Inform-A-Gram No. B39.

Stacked Retaining Rings. A new, fully illustrated brochure recently released by Industrial Retaining Ring Co., Mt. Vernon, N. Y., describes the applications and advantages of Stacked Open-Type retaining rings. Also included are specification data sheets and price lists.
Circle Inform-A-Gram No. B40.

Mechanical and Electrical Data on the Precise Super 50 grinder-miller for heavy duty work is presented in this folder available from the Precise Corp., 1328-30 Clark St., Racine 1, Wis. Also included, is information on the inside and outside features of the versatile unit.
Circle Inform-A-Gram No. B41.

Gyro-Vises. Publication of a catalog page describing the new Gyro-Vise No. 72½ is announced by the Columbian Vise & Mfg. Co., 9021 Bessemer Ave., Cleveland 4, Ohio. Price data, specifications and applications of the new vise are listed. Action photos show many possible uses.
Circle Inform-A-Gram No. B42.

Manlift Elevators. This bulletin illustrates the complete line of Humphrey Manlift elevators which provide simultaneous up and down employee transportation with no waiting or delay. It is available from Humphrey Elevator Co., Inc., Faribault, Minn. Write for Bulletin HB-54 or—
Circle Inform-A-Gram No. B43.

Latest Developments on a new variable speed drilling and tapping machine have just been released to the metalworking field by the Edlund Machinery Co., Cortland 38, N. Y. A colorful, illustrated bulletin, #140, which describes this machine, giving complete specifications, construction features and ordering information, is available on request.
Circle Inform-A-Gram No. B44.

Tapping & Threading Equipment. This 6-page circular illustrates the three different models of hand tappers manufactured by the Lassy Tool Co., Plainville, Conn., and also shows the range of accessories now available. Also various methods for lathe tapping and threading, plus the hand tapping of large work right on the drilling machine, is depicted.
Circle Inform-A-Gram No. B45.

Cutting Oils. The different cutting oils in the Sunicut "W" series are described in a new Sunoco technical bulletin. The bulletin can be obtained by writing the Sun Oil Co., Philadelphia 3, Pa., or in Canada, Sun Oil Company, Ltd, Toronto, or—
Circle Inform-A-Gram No. B46.

Cold Finished, Case-Hardening Jalcase Steels are the subject of a new 14-page booklet published by the Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa. The booklet illustrates and describes the 10 grades of Jalcase, which is a free-machining open hearth steel with mechanical properties for high quality machined parts.
Circle Inform-A-Gram No. B47.

"The Greatest Advance in Lathe Construction" is the title of a brochure presented by Hardinge Brothers, Inc., of Elmira, N. Y. The pamphlet elaborates on Hardinge lathe features such as a solid full bearing carriage and easy reading black and white dials. The literature is well-illustrated and includes dimensions and specifications.
Circle Inform-A-Gram No. B48.

Tool Steel. Two bulletins covering water-hardening carbon tool steel and water-hardening carbon-vanadium tool steel have been added to the catalog of popular tool steels manufactured by Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. In the attachments, complete data is given on typical analysis, characteristics, typical applications, forging, general heat treatment, annealing and tempering.
Circle Inform-A-Gram No. B49.

This Bulletin, P-54, presents features, specifications and applications of Portelvator, the handy Hamilton

portable elevating table. It is available from the Hamilton Tool Co., Ninth St. at Hanover, Hamilton, Ohio.
Circle Inform-A-Gram No. B50.

Industrial Trucks. Case history folders, relating how leading companies are using industrial power trucks to great advantage are now available to industry in package form from Lewis-Shepard, Inc., Watertown, Mass.
Circle Inform-A-Gram No. B51.

Optical Comparator, Model R-300, is illustrated and described in a circular available from the Portman Instrument Co., Town Dock Rd., New Rochelle, N. Y. Literature contains mechanical construction details and specifications also.
Circle Inform-A-Gram No. B52.

Fabrication Techniques, uses and properties of its prefinished metals are described and illustrated in a new 24-page booklet available from the American Nickeloid Co., Peru, Ill.
Circle Inform-A-Gram No. B53.

Low Carbon Plate Grinding Service to size and specification is offered by the Marshall Steel Co., P. O. Box 108, TP, LaGrange, Ill., from over a million pounds of low carbon strip and plate ranging from 0.088" to 6" thick, 25" wide and 98" long. A catalog available explains all.
Circle Inform-A-Gram No. B54.

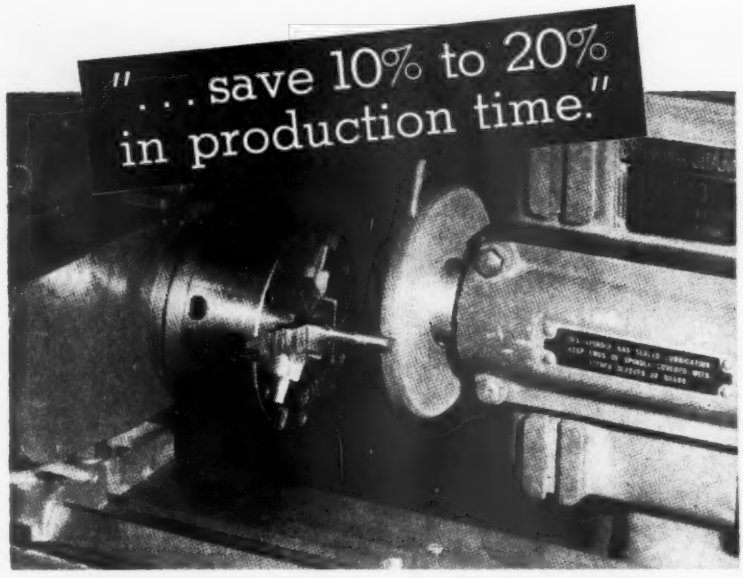
WORK MOVES FASTER
COSTS LESS with a Fray
No. 10-R UNIVERSAL RAM-TYPE VERTICAL
MILLING MACHINE
You get a wider work range than with any other machine this size. You can machine at any angle—vertical, horizontal or both. You can mill, drill or bore at any angle. Hence resetting isn't necessary. Just change the machine—changing is quick. (For vertical and regular horizontal milling, use the 10-RH.) Jobs are done faster and better ...at less cost. • It's Universal • Rugged • Easy to Operate.
A high precision tool.
Write for details and specifications.
Bulletin 10.
FRAY "ALL-ANGLE" HEAD TYPE 4
For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.
FRAY
All-Angle
FRAY MACHINE TOOL CO.
2935 NO. ONTARIO STREET, BURBANK, CALIFORNIA
CIRCLE INFORM-A-GRAM KEY NO. 145

Wire Straightening & Cutting Machines are described in Bulletin No. 58 put out by Mettler Machine Tool, Inc., New Haven 11, Conn. The Shuster constant speed automatic machines discussed range in capacity from 0.025" to ½" diameter wire.
Circle Inform-A-Gram No. B55.

A Mechanical Cleaner that reportedly removes 92 per cent of oil moisture and dirt from compressed gas and air lines is illustrated and described in a brochure available from the Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.
Circle Inform-A-Gram No. B56.

Industrial Drills are described in a new brochure offered by the Do-All Co., Des Plaines, Ill. Items covered include taper shank, straight shank, three and four-fluted drills, drill sets, drill blanks, counter sinks and hardened sleeves.
Circle Inform-A-Gram No. B57.

Designed for Continuous Water Recirculation use is the Hypro Model 4300 bronze pump, described in a new two-color bulletin issued by Hypro Engineering Inc., Dept. KP 401 N. Washington Ave., Minneapolis 1, Minn. The illustrated literature points out the features of the pump.
Circle Inform-A-Gram No. B58.



Buck Chucks ideal for grinders

AJUST-TRU

PAT. NO. 2,639,157

CHUCKS

Only universal scroll chuck with .0005" precision—for lathes, grinders, dividing heads, screw machines.

3-jaw and 6-jaw in 4", 5", 6", 7½", 9" sizes. 2-jaw Aviation chucks, for odd-shaped parts, in 6", 7½", 9" sizes.

ALSO SUPER-GRIP 4-JAW INDEPENDENT CHUCKS FOR 9" to 16" LATHES.

Grinding the diameter and face of a centerless carbide tipped end mill—within plus .0000", minus .0005"—on a 5" Buck chuck is shown at the Brubaker Tool Corp., Millersburg, Pa.

THEIR REPORT: *"The chucking of various diameters to close tolerance is expedited with the Buck Ajust-Tru chuck. By limiting the indicator truing and chucking necessary with the old line chucks, we save 10% to 20% in production time."*

You save *every* time you use a Buck—for dead true work, on duplicate parts chucking at scroll chuck speed (.0005" precision guaranteed), by eliminating costs of collets and special holding fixtures. No price premium. Send for latest catalog today.

BUCK TOOL COMPANY
418 SCHIPPERS LANE • KALAMAZOO, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 146

"Stock Cylinders." For more information write the Miller Fluid Power Co., 2040 N. Hawthorne Ave., Melrose Park, Ill., or—
Circle Inform-A-Gram No. B59.

Hydro-Mechanical Devices are cataloged in Bulletin 22 put out by the Pathon Mfg. Co., Pacific Ave., Cincinnati, Ohio. The booklet gives complete data on various models of oil hydraulic cylinders and hydraulic directional control valves, plus table of sizes and engineering information.
Circle Inform-A-Gram No. B60.

Quick Connect-Disconnect Couplers which have such features as greater flow, smaller dimensional size and higher pressure applications are illustrated and described in Catalog VP-83 put out by Snap-Tite, Inc., 201 Titusville Rd., Union City, Pa. Specifications included.
Circle Inform-A-Gram No. B61.

Isolators, designed to reduce shock and noise caused by impact-type machines and vibration and noise caused by heavy rotating and reciprocating machines, are described in detail in a brochure now available from The Barry Corp., Watertown, Mass. Write for Bulletin 538, or—
Circle Inform-A-Gram No. B62.

Metal Cutting Shears. Information on Beverly Throatless shears is presented in this illustrated brochure. The folder contains data on some unique applications of this shear plus a display of various models. Write to the Beverly Shear Mfg. Co., 3004 W. 111th St., Chicago 43, Ill., for Catalog CC 153, or—
Circle Inform-A-Gram No. B63.

Vertical Turret Mills. Fully illustrated and described are "Perfect 36" vertical turret mills in a new catalog offered by Rogers Machine Works, Inc., Alfred, N. Y. Various operations such as boring, drilling, turning and threading are shown as well as complete specifications.
Circle Inform-A-Gram No. B64.

For General and Analytical Laboratories. Pilot Plant and Production, a new brochure on electric ovens, gravity and recirculating, is available from the Blue M Electric Co., 306-308 W. 69th St., Chicago 21, Ill. If writing the company direct, ask for Bulletin #1153.
Circle Inform-A-Gram No. B65.

Drill Jigs & Fixtures. This catalog contains data essential to designers and engineers and the contents are also of interest to others in the metal-working field. It contains applications, technical data and transfer diagrams as well as specifications. Write to Swartz Tool Products, 13330 Foley Ave., Detroit 27, Mich. for Bulletin No. 953 or—
Circle Inform-A-Gram No. B66.

How Dust Can Be Controlled in industries working with asbestos is discussed in a new bulletin published by the American Wheelabrator & Equipment Corp., 1183 South Brykit St., Mishawaka, Ind. The illustrated brochure (No. 412) has four case histories which show how Dustube cloth-tube type dust collectors are employed to ventilate various dust producing machines.
Circle Inform-A-Gram No. B67.

Cemented Carbide Die specifications and prices are included in Bulletin D-134, recently published by the Carboloy Department of General Electric, Detroit 32, Mich. The publication lists round dies, rough cored and finished, braze-type rough mandrel nibs, finished tube-drawing mandrels, square and hexagon shape dies, nail gripper and header die nibs, guide rings and wire guide bushings.
Circle Inform-A-Gram No. 67A.

This Bulletin, No. 57-A, is yours for the asking. It is well illustrated and contains design features and specification. Write to the Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y., or—
Circle Inform-A-Gram No. B68.

Electric Heat Treat Furnaces are covered in a new bulletin just published by Holcroft and Co., 6545 Epworth, Detroit 10, Mich.
Circle Inform-A-Gram No. B69.

Magnetic Separators. Complete information on the construction and uses of magnetic separators for fast and easy handling of steel sheets and plates is included in Bulletin 1053 recently published by the Basco Mfg. Co., 5 Woodside St., Stamford, Conn. Also described is how these units reduce damage to machinery and eliminate injuries to operators.
Circle Inform-A-Gram No. B70.

Surface Grinder. Specifications, dimensions, illustrations included in bulletin on 12" hand feed precision grinder. Write to Brett Machinery Co., 1 N. Crawford Ave., Chicago 24, or— **Inform-A-Gram No. B71.**

A Designation Chart for carbon and low alloys steels has been issued by Empire Steel Castings, Inc., Reading, Pa. It identifies the company's Isocast carbon and low alloy castings with A.S.T.M., Federal, Navy, A.I.S.I., and S.A.E. specifications. If writing direct to the company, ask for Bulletin 253-LA.
Circle Inform-A-Gram No. B72.

EACH MACHINIST BECOMES A 5346

ONE MAN GANG

WITH PORTELVATOR®

THE HANDY HAMILTON PORTABLE ELEVATING TABLE

One man can lift, lower, and transport compact, heavy loads which, without Portelvator, would require the combined strength of three or more men.

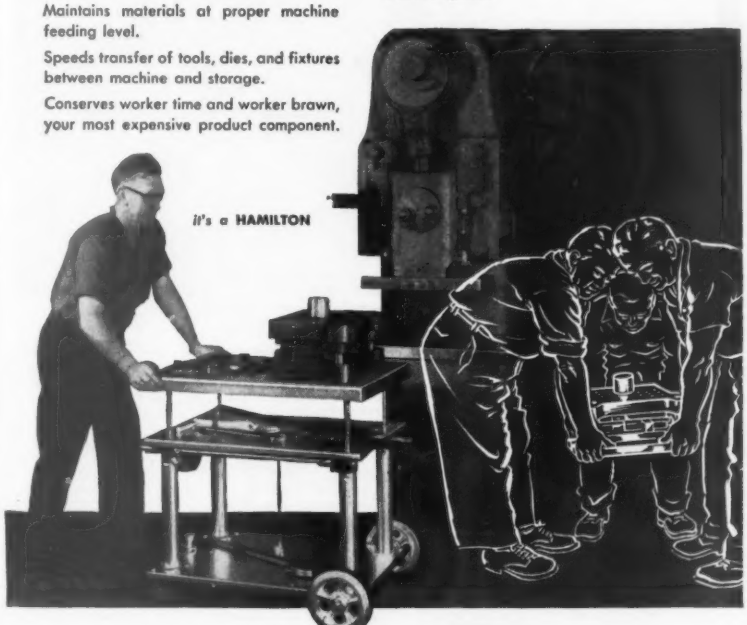
Maintains materials at proper machine feeding level.

Speeds transfer of tools, dies, and fixtures between machine and storage.

Conserves worker time and worker brawn, your most expensive product component.

Reduces injuries to workmen, and damage to tools and materials due to manual handling.

Provides a portable work bench when and where required.



WANT MORE FACTS?
Write for FREE Hamilton Bulletin No. 5346.
Address The Hamilton Tool Company,
832 South Ninth Street, Hamilton, Ohio

IT'S A Hamilton Tool
USE IT WITH CONFIDENCE

CIRCLE INFORM-A-GRAM KEY NO. 147

MEN YOU SHOULD KNOW . . . .

R. G. Ellis

Howard G. Foster

Elmer C. Schacht

Leon E. Hoogstoel

Edwin C. Evans

WHY YOU GET
Precision Flatness, Finish and Parallelity in Production Quantities . . .
WITH A LAPMASTER
Here is the machine to do the job if you want precision flatness in production quantities at an economical rate. Lapmaster machines readily lap to the extreme close tolerance of one light band (.0000116") or less. In addition, they produce an extremely fine finish to as low as 1 RMS.
Check these features and investigate the possibilities for the Lapmaster in your plant.
1. Operator requires no previous lapping experience.
2. Automatic timer provides controlled lapping cycle for production efficiency and allows time for pre-loading workholders.
3. Simplicity of design allows ease of loading and unloading.
4. Loose abrasive distributed evenly over lapping area insures uniform results.
5. Serrated lap plate collects and disposes of spent compound and removed stock.
6. Precision laps identical parts or parts of various shapes, heights and materials in one cycle.
7. Self-conditioning lap plate eliminates down time for truing or replacement.
How the Lapmaster Works
The work being lapped causes wear on heavy cast iron lap plate.
As the work is wearing the lap, the conditioning rings are continually conditioning the lapping plate surface.
Since the wear action of the conditioning rings is greater than the wear caused by the work being lapped, the flatness of the lap plate is automatically maintained.
FREE DATA
LAPMASTER
Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today.
JOHN CRANE
Crane Packing Company Dept. TP-4, 1809 Cuyler Ave., Chicago 14, Ill.
CRANE PACKING COMPANY

CIRCLE INFORM-A-GRAM KEY NO. 148

Micromatic Hone Corp. of Detroit announces the promotion of **R. G. Ellis** to assistant chief engineer. Ellis, who has been designing machine tools for 27 years has been with Micromatic since 1939.

◆

The Gisholt Machine Co., Madison, Wis., announces the transfer of **Howard G. Foster** to its Clifton, New Jersey branch office. Foster has been with Gisholt for 14 years and will handle both sales and service work out of the Clifton office.

◆

Elmer C. Schacht was reelected to his fifth term as president of the Behr-Manning Corp. at the annual board of directors' election of officers. Elected vice presidents at the meeting were **Leon E. Hoogstoel,** the firm's technical director and **Edwin C. Evans,** director of manufacturing. Other officers, all reelected, are **John O. Amstuz** and **John M. Cook,** vice presidents; **William I. Clark,** secretary; and **Miss H. Vermaidel** and **Arthur W. Bedell,** assistant secretaries. **Terence A. Cordner,** treasurer, was designated controller by the directors.

◆

R. M. Reichl, formerly vice president of Hydropress, Inc., has established the R. M. Reichl Company, a firm specializing in development-engineering, process-development and consulting. His offices will be located in the Forest Hills section of Long Island, New York.

◆

The appointment of **Robert Von Rotz** as chief engineer has been announced by the Tuthill Pump Co. of Chicago. Prior to joining Tuthill, Von Rotz was chief engineer with Applied Research and Development Corp. of New York and Berne, Switzerland.

. . . . MEN YOU SHOULD KNOW

Donald G. Clark

Frederick E. Munschauer, Jr.

Sam D. McIlwain

John M. Thullen

Wallace L. Howe

Donald G. Clark has been elected a director of Firth Sterling, Inc., of Pittsburgh, Pa. He was formerly a vice president and director of the firm and for the past few years has been serving as a consultant.

◆

Fredrick E. Munschauer, Jr. has been elected to the newly created office of vice president in charge of manufacturing and industrial relations of the Niagara Machine & Tool Works, Buffalo, N. Y. Along with his new responsibilities, the new vice president will continue as works manager, a position he has held since 1946.

◆

Sam D. McIlwain, formerly production supervisor at the Westinghouse Corp., is now product engineer of the Detroit Stamping Co. Another appointment at the Stamping Co. makes **John M. Thullen** purchasing agent for all industrial raw materials, production parts, services, finished stores and general factory supplies. Thullen was most recently with the Harry Ferguson Co., as special contract negotiator and buyer.

◆

At the Norton Company's recent 69th annual stockholders' meeting, one new vice president and two new directors were named. **Wallace L. Howe** was elected vice president in charge of research and development and also was given a seat on the board of directors. **John M. Cook,** vice president and general sales manager of Behr-Manning Corp., a subsidiary of Norton, became a director of the Troy, N. Y. division. **Henry M. Elliot,** first vice president of Behr-Manning, retired as a director of Norton. At the meeting, **George N. Jeppson** was elected chairman of the board and **Milton P. Higgins,** president.

5203-R

IT'S A HAMILTON

INDEED

There is no way under the sun to do small, precision tapping with "production" speed, satisfactory tap life and acceptable accuracy, other than to use a tool designed for the specific purpose.

THE *Hamilton* SUPER-SENSITIVE SMALL HOLE TAPPING MACHINE IS SUCH A TOOL!

WANT ALL THE FACTS

Write for Hamilton Bulletin No. 5203. Address The Hamilton Tool Company, 832 South Ninth Street, Hamilton, Ohio.

IT'S A *Hamilton* Tool

USE IT WITH CONFIDENCE

CIRCLE INFORM-A-GRAM KEY NO. 149

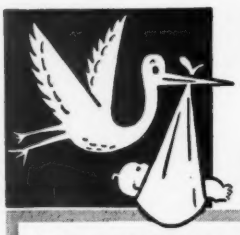
. . . Babbitting, from page 139

liquidus temperature. The shell should have a silvery appearance on removal from the bath.

The shell should not be allowed to cool before casting the liner.

In casting, the mandrel and shell should be at temperatures higher than 250°F. to eliminate the danger of moisture or steam. The shell should be at a temperature above the melting point of the bonding or tinning metal, the temperature of the mandrel should be approximately 100°F. higher than that of the shell so that solidification can progress from the shell to the mandrel. The stream of metal should be poured against and moved around the circumference of the mandrel to prevent local overheating. Use a ladle of sufficient capacity to permit pouring the entire bearing at one time; this reduces the likelihood of cold shuts, laminations, or folds.

In the installation of bearings, make certain that all foreign particles, such as dirt, metal chips and lint, are wiped from the bearing and shaft with a lint-free material. Make certain that the clearances between the bearing and the shaft are adjusted in accordance with manufacturer's recommendations. Make certain that the shaft and the bearing are in proper alignment and that the tension of the bolts is even. In the operation and maintenance of bearings, select the proper lubricant. In most cases the equipment manufacturer has recommended the lubricant found to have the necessary properties. Set up a regular maintenance and inspection schedule for all bearings and **follow it closely.** Keep your lubricant free of all foreign matter (you bought it that way) by using proper filtering and cleaning devices. Run the equipment at the speed and under the load for which it was designed.



IT'S NEW, IT'S HERE
A NEW BABY AT
MARSHALL STEEL

IT'S LOW CARBON GROUND FLAT STOCK

MARSHALCRAT

ARISTOCRAT OF LOW CARBON GROUND FLAT STOCK

Compared to TOOL STEEL ground flat stock it gives up to

60% SAVINGS in Steel Costs!

Use it for Jigs, Fixtures, Patterns, Machine Parts or other pieces that require nothing more than case hardening.
An ideal material.

- IT IS EASY TO MACHINE
- GRINDS TO A GOOD FINISH
- TAKES A GOOD CASE
- HAS EXCELLENT WELDABILITY
- OVER 190 Standard sizes in stock

We stock over a million pounds of steel. Twenty thicknesses up to 6 inches, 25" wide and 98" long. Modern Shear and flame cutting, including sketches.

Also a bar, strip and plate grinding service. New up-to-date facilities including most advanced grinding equipment. It will pay you to investigate.

Write for latest catalogs & prices

MARSHALL STEEL CO.

Producers of "ARISTOCRAT" line of TOOL STEEL GROUND FLAT STOCK

P. O. BOX 108 - T LA GRANGE, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 150

Profitable Eavesdropping

Eavesdropping may be impolite in social circles, but it can pay off for a business enterprise on occasion.

This was proved recently by the experience of a Coshocton, Ohio, restaurant owner, who couldn't help overhearing some of the General Electric Company's work simplification sessions held in his establishment.

Major result of his eavesdropping — which was encouraged when detected by G-E Industrial Engineering Supervisor Elmer Devor — was a rearranged and considerably more efficient restaurant operation.

In what might be termed a healthy instance of good "neighborly" relations, restaurateur Walter Neighbor simply applied the efficiency techniques he learned from nearby G-E Laminated & Insulating Products Dept. plant people.

As the work simplification course unfolded before him, Neighbor studied his own operation, — particularly with reference to the number of steps required to fill an order. He found that as he came from his "Riverside Inn's" dining room or snack bar, he was within 32 inches of his deep fat cooker and short order counter. But, due to this counter's construction, he had to take 28 steps to get to it.

This did not fit in with work simplification teaching.

After some thought, he cut an entrance through the counter, so that instead of taking 28 steps, he now had to walk only 3 feet.

He also learned from the G-E course that excessive reaching fatigued a worker; accordingly, he changed the location of his deep fat cooker and sandwich counter, so that employees could work comfortably at the proper level.

Further investigation revealed that the meat cutter was too far from the refrigerator, and that the salad-preparation counter was too distant from the refrigerator, where the vegetables were kept fresh. A rearrangement was effected whereby meat could be taken from the refrigerator and immediately placed in the cutter, with only a simple turn-about required.

The same arrangement was made for the preparation of salads.

Incidentally, cutting an entrance through the counter to the deep fat fryer alone saved Mr. Neighbor one mile of walking a day.

Also, Mr. Neighbor explained to the seminar group that when they left at 5:00 P.M., the entire floor had to be swept to clear up cigarette ashes or butts dropped by a careless few. By common agreement, all hands agreed to spill nothing on the floor, thereby eliminating the entire sweeping operation.

New Instrument Unscrambles Metal Mix-Ups

Non-destructive testing and sorting of accidentally mixed or incorrectly processed metal parts can be done speedily by the new Model C-1 Cyclograph. The instrument can be used on either ferrous or non-ferrous metals and will sort raw stock, semi-finished, or finished parts by their metallurgical characteristics such as analysis, hardness, structure, case depth, etc. With a known and acceptable part used as a "standard" in adjusting the instrument, unwanted parts are quickly separated from the good ones.

Photo courtesy J. W. Dice Company

The Model C-1 Cyclograph can be used as a "hand" sorter, in which case the operator watches the screen and manually throws out the off-standard parts, or it can be used in conjunction with a Type 407 Automatic Relay Unit. The Relay Unit eliminates operator discrimination and makes it possible to sort many more thousands of parts per day. Parts can be passed through the test coil on a belt conveyor or by other fast feeding means. The Relay Unit sends out a reject signal whenever an off-standard part passes through the test coil

. . . *Continued on page 154*

8419

PRECISION GEARS

YOU who use small gears, (to 6" O.D. of the gear blank) can improve the performance of your product, through increased gear precision, without sacrifice of gear production.

YOU who use small, fine pitch, precision gears can increase your gear production without sacrifice of gear accuracy, or improve your gear accuracy without sacrifice of gear production.

The Hamilton Precision Gear Hobber, the hobber with a "reserve of accuracy," regularly holds work spindle and hob spindle runout to less than .0002", workspindle and tailstock spindle alignment to less than .0002", and this workmanship is maintained throughout the machine.

WANT FACTS?

Write for Bulletin No. 5419.
Address The Hamilton Tool Company
832 South Ninth Street,
Hamilton, Ohio.

IT'S A Hamilton Tool

USE IT WITH CONFIDENCE

CIRCLE INFORM-A-GRAM KEY NO. 151

. . . Radioactive Ore, from Page 137

There, it was bombarded with neutron rays for eight days in a "nuclear reaction pile," then blended in giant cement mixers with 22 tons of identical iron ore powder. Finally, 54 tons of a second type of iron ore were added to obtain the mixture.

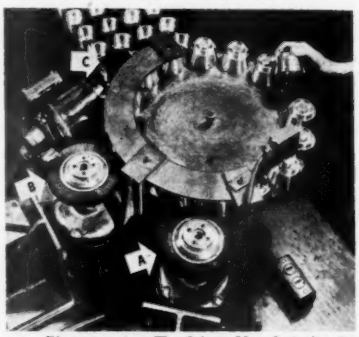
Ford scientists believe results of the test indicate a need for further research into the way iron particles adhere.

Brushing Deburrs 1400 Aluminum Parts per Hour

A power brushing method for removing feather burrs from a machined slot in an aluminum fuse component has increased production by 300 percent.

The Gilman Engineering Company, Wisconsin, was faced with this burr removal problem. Hand methods for doing this job, with output of 360 units per hour, proved unsatisfactory. Not only was this hand operation too slow, but results were not uniform and left poorly finished edges.

With the help of power brushing specialists from the Osborn Manufacturing Company, Cleveland, Gilman engineers constructed a rotating brushing machine equipped with three Osborn .005 wire wheel brushes. There are 16 spindles on the table. Aluminum fuse parts do not rotate, they rest on pins.



Photos courtesy The Osborn Manufacturing Co.

Fig. 1. This rotating brushing machine removes feather burrs from a machined slot in an aluminum fuse component at the rate of 1400 per hour. The first brush in position A rotates clockwise against the slot. The brush in position B rotates counter clockwise to brush the other side of the slot. These not only remove the burrs but also finish the edge. The third brush, position C, sweeps down through the slot to finish the bottom.

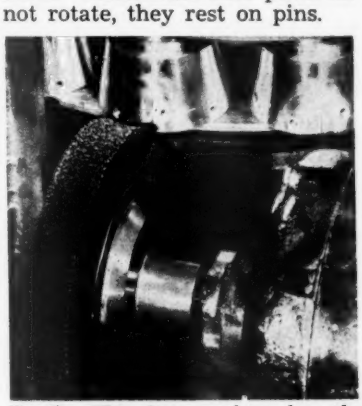


Fig. 2. This close up shows how the brush removes the edge on the bottom of the slot. (position C)

The first brush in position A rotates clockwise against the slot. The brush in position B rotates counter clockwise to brush the other side of the slot edge. The third brush, position C, sweeps down through the slot to finish the bottom edge.

The slots come clean and smooth, at a rate of 1400 units per hour, an increase of 1040 units of higher quality.

110 Million Run!

WITH THE *SAME* DICKERMAN FEEDS!

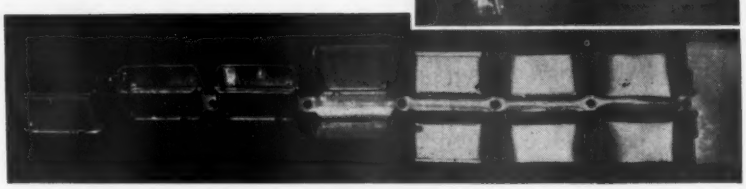
HERE ARE AMAZING, ACTUAL PRODUCTION FACTS ON FEEDING STOCK FOR ARMY RIFLE CLIPS!

EQUIPMENT:
3 - 105 TON FERRACUTE PRESSES
3 - DICKERMAN DIE FEEDS

SPEED:
80 TO 85 PIECES PER MINUTE

PRESS TIME:
OVER A YEAR ON 3 SHIFTS — 24 HOURS PER DAY

PRODUCTION:
90,000 PIECES PER FEED, PER DAY
110,000,000 PIECES PRODUCED TO DATE — WITH FEEDS STILL OPERATING IN ACCURATE, SERVICEABLE CONDITION!



Die ribbon from one of three 10 station progressive dies. Extreme proving ground accuracy is vital on every press stroke.

These are not claims, they're actual, cold — dollars and cents production facts. On your next punch press job, if production is a factor — if parts cost is a factor — if press speed is a factor — You can't afford not to use a Dickerman Feed!

SEND TODAY

for literature and CATALOGS on the complete, dependable line of DICKERMAN FEEDS.

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H. E. DICKERMAN MFG. CO.

324 - 224 ALBANY STREET SPRINGFIELD, MASS.

"SEE US AT BOOTH 1742 — ASTE SHOW"

CIRCLE INFORM-A-GRAM KEY NO. 152

Glass Cloth Revolutionizing Drafting Procedures

The versatile family of plastics born of polyester resins reinforced with glass fiber has given industry a new material for which scores of uses are being found, including bodies for automobiles. Probably none of these uses offers a greater saving in time, toil and expense than a photo-template material which engineering departments of many industries assert is revolutionizing drafting and reproduction procedures, and sharply cutting cost.

From the aircraft, automotive and appliance industries, use of this material has spread to mapping, tooling, lofting, plane table surveying—wherever, in fact, dimensional stability must be maintained in originals, master duplicates and true-to-scale reproductions. In the aircraft industry with its constant use of huge templates, applications verge on the spectacular. A 4 x 12-foot reproduction formerly made on the painted surface of an aluminum or steel sheet of that size now requires merely a roll of the new material no bulkier than a window shade, doing away with problems of bulk, weight, shipping and storage, not to mention the saving of sometimes critical metal.

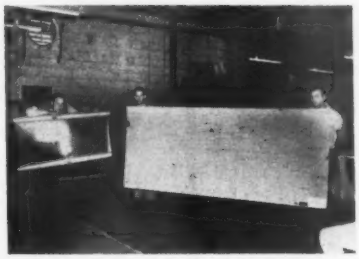


Photo courtesy Tru-Scale Engineering Supply Co.

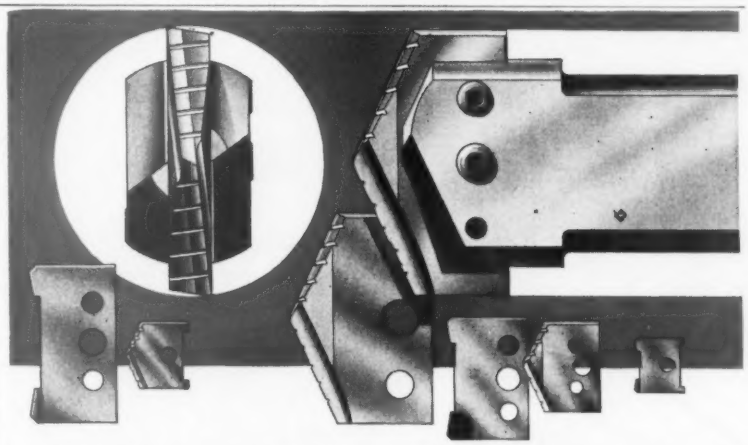
The glass cloth reproduction is shown, at left, in contrast with the unwieldy metal one it replaces. Improved ease of handling, reproduction, storage and shipment is obvious.

The new template material, is made of impregnating cloth woven from continuous glass fibers with a blend of Paraplex polyester resins. The result is a sheet material with dimensional stability equal to or better than that of the metal it replaces, but with transparency greater than that of tracing paper.

Making copies for sub-contractors, for example, engineering departments working from metal sheet had to use costly projection cameras. This method involved time delays, often introduced troublesome inaccuracies, and required skilled technicians. In contrast, a polyester glass cloth template can be copied without distortion on a relatively inexpensive contact printing table in which vacuum holds the original firmly against the copy. Such work can be done competently by non-technical grade personnel. Silver emulsions, Diazo or any of the usual sensitizing materials may be used. Drawings made on metal plates can be copied rapidly on the sensitized glass cloth by reflex printing.

The eight days time formerly required for this operation has shrunk to seven hours.

Processed by Swedlow Plastics Co. of Youngstown, Ohio, with resins developed by Rohm & Haas Co., this material is made in widths up to 60 inches in cut sheets or in 100-yard or longer rolls. It is furnished in 5½-mil thickness, down to two mils.



Drill Large Holes from the Solid with Interchangeable Spade Drills

Made in 256 cutter sizes, 1 to 5 inch diameter, in steps of ¼, Conner type Spade Drills drill the required diameter in one operation, need no retracting to clear them of chips. Only eight sizes of holders are needed to handle all cutter sizes.

For general purpose work and in the Tool Room, use the cutter and holder assembly shown above. It is a rugged tool of great rigidity, recommended for large holes of medium depth.

For Production Drilling (for repetitive work), and for the somewhat deeper holes, use Conner type Oil Hole Holders designed for easy coolant flow and fast chip expulsion.

Send for Catalog and Price List

For Boring: Core Drill Cutters, for semi-finishing of cored and drilled holes, are made in the same 256 sizes, to fit the same spade drill holders.

The Gairing Tool Company is now the exclusive manufacturer of the Spade and Core Drills, both standard and special, formerly made by the Conner Tool & Cutter Company.

See us Booth 225 at the Tool Show

In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING Tool Company

21227 HOOVER ROAD, DETROIT 32, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 153

. . . Mix-Up, fram page 151

and this signal can be used to operate a solenoid operated reject gate paint spray marking device or other reject means. The combination permits fully automatic, high speed inspection.

Size and shape of the part presents no particular problem as test coils are wound for any size opening desired. Typical parts inspected are: bolts, nuts, screws, aircraft valves, roller bearings, AP shot, jet engine rotors, blades and other forgings, malleable castings, welded rod, automotive parts, steel and copper tubes, piston rings, ordnance items, and barstock.

New Stretch Forming

A new self-contained stretch forming press with a shell die made of sheet steel, ranging from .047" to .125" in thickness and combining thermostatically controlled heat, has just been announced.

The machine will stretch form magnesium parts for aircraft, such as outside skins, fairing, panels and other fuselage skins up to ⅛" thickness. The die eliminates all hammering and expensive presses. Inexperienced labor can operate it and there is very little maintenance.

Because of the unique design and construction, a press as illustrated, only occupies a space of 2 ft. x 3 feet. A group of these presses can be installed in a line so that one operator can handle several at a time. One operator produces 20 to 30 pieces a day on each die, as compared to two or three by ordinary methods.

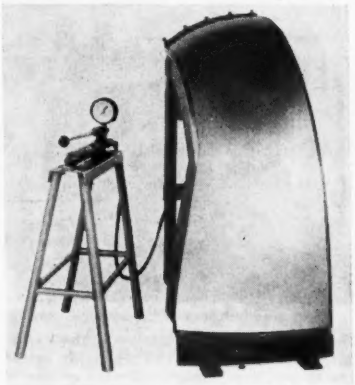
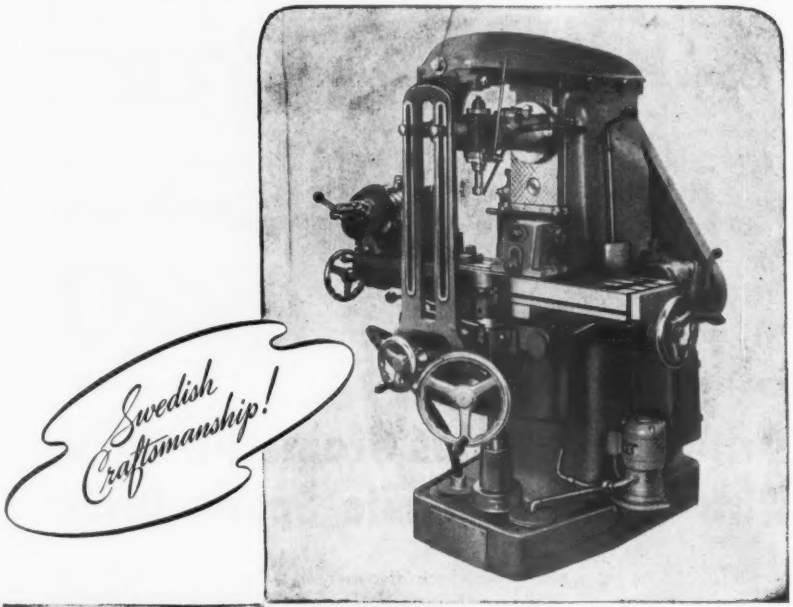


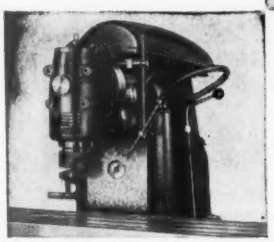
Photo courtesy R. A. Lalli Co.

Section of the Cam Shell Door Die with hydraulic pump.

A major advantage is the actual low cost of the dies, which are shell type and cost less than half the conventional stretch press dies. Materials to construct the die run less than ¼ by comparison. There is little or no tooling time involved and elaborate preparations such as plaster grids and time in lofting are not necessary. A Mock-Up is all that is needed.

Doors and panels are made to forty thousandths thickness, stretched over dies .047" thickness with the skins retaining structural strength. There is no limitation to the size of the sheet as the machine can be made to any size or shape. Less waste is also assured. Pyrometer thermostatic control assures accuracy and guarantees forming pieces without distortion. The operator controls the amount of stretch by operation of a hydraulic hand or motor driven pump. The whole process takes less than 20 minutes.





Sajo Vertical Milling Attachment

The Sajo "Plain" Milling Machine

the SAJO "UNIVERSAL" MILLING MACHINE

exemplifies the expert workmanship that is traditional in Swedish machine tools. Like all SAJO Millers, this new Universal Milling Machine was designed and built to the highest standards of quality and practical utility.

Avoidance of exterior "luxury" features, slight in value but substantial in cost, and concentration on the vital factors of construction, enable the SAJO to deliver top performance at moderate cost.

SAJO Millers are available in Plain and Universal types, with longitudinal power table feed only, or with power feed in all directions. Screws and dials are in the U. S. inch system.

★ Standard Equipment includes:
3 HP motor and starter equipment, motor driven coolant system, adjustable table feed nut to allow climb-milling, 1" arbor, arbor support brace.

★ Extra Equipment:
Universal Dividing Head, Vertical Milling Attachment, Slotting Attachment, Swivel Base Vise, Rotary Table.

CONDENSED SPECIFICATIONS

Table Size	41½" x 9¼"
Longitudinal travel: Plain Miller	24½"
Universal Miller	27½"
Transverse travel	8¼"
Vertical travel	19"
12 spindle speeds	36-1540 RPM
Table feeds	12
Taper in spindle	No. 40 NMT
Main motor	3 HP

Precision anti-friction bearings on spindle and gear shafts
One-piece column and base
Net weight—2200 lbs.

Write for Catalog

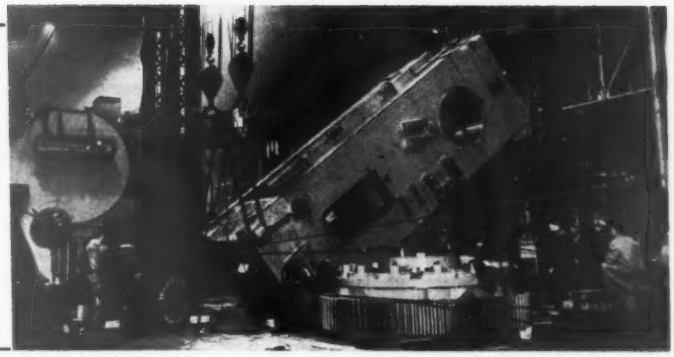
NO PRIORITY—— PROMPT DELIVERY——ATTRACTIVE PRICE

AUSTIN INDUSTRIAL CORP. 76-X MAMARONECK AVE. WHITE PLAINS, N. Y.
DEALERS IN PRINCIPAL CITIES

ASTE SHOW BOOTH 1334
CIRCLE INFORM-A-GRAM KEY NO. 154

6,000 TON PRESS

This is the third mammoth mechanical forging press for crankshafts installed at the Chrysler Corporation's Dodge Forge Plant in Detroit, Mich. The 6,000-ton press, which cost well up in six figures, is the latest installation in a five-year modernization and expansion program at the Dodge plant. Now the three "king-size" presses are ready to supply the entire crankshaft requirements for Plymouth, Dodge, DeSoto, Chrysler and Imperial cars and Dodge trucks.



"Compensating Equalizer"

A Multiple Clamping Device

A new device that clamps up to 10 parts at once by automatically compensating for size differences, has recently been developed. Called "Compensating Equalizers," the devices provide a definite mechanical lock for parts that are hard or soft, regular or irregular in contour. They can be applied to all types of vises for milling, grinding, etc.,

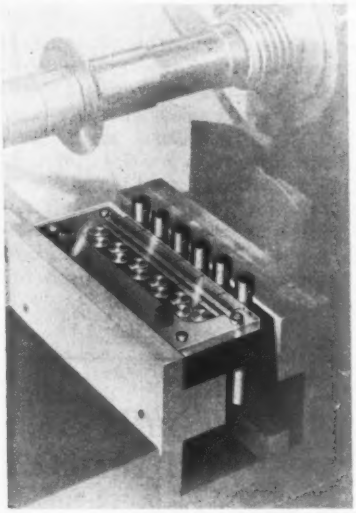


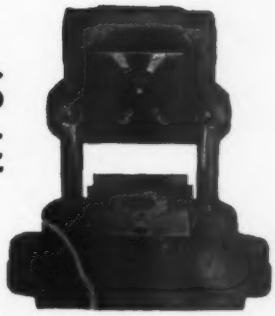
Photo courtesy Design Aids Co.

Clear plastic cover used to show floating rollers. Steel cover normally furnished.

. . . *Continued on page 158*

"A MUST wherever WASHERS are made!"

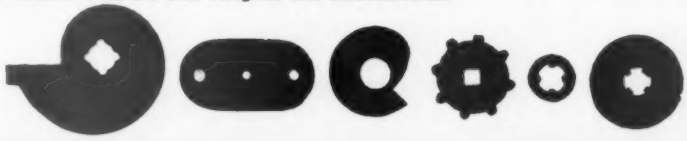
HOVIS OFFERS YOU THIS SIMPLE, UP-TO-THE MINUTE METHOD



There's no need to make a complete new Die for any type washer or blank. The HOVIS UNIVERSAL WASHER DIES provide a Master Holder and by merely changing 5 SMALL, EASILY REMOVABLE PARTS the new washer or blank is produced . . . Special sets of parts are available for use in Master Washer Units enabling customers to produce irregularly shaped pieces and shallow draws. Multi-Washer Dies are also designed and manufactured.

Made in 5 sizes:
¾"—1½"—2½"—4"—6"

Write for literature.



HOVIS SCREWLOCK COMPANY

8100 E. NINE MILE ROAD VAN DYKE, MICHIGAN
Phone: Slocum 7-4800 Suburb of Detroit
CIRCLE INFORM-A-GRAM KEY NO. 155

Press Brake Insert Eliminates Hand-Forming

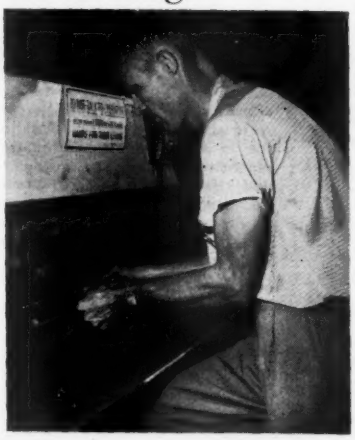
TEMCO Aircraft Corporation of Dallas, Texas, is using an inexpensive insert on its power brake dies that allows an average saving of more than $1 on every part produced

Savings result from the insert's elimination of much handforming that normally followed forming on the power brake machines. Rejections, too, are reduced by the insert.

It is made of 1/16 or 1/8-inch scrap steel and designed for use when parts with large holes, cut-out, or scarfs are being formed.

Normally, power brake pressure will cause a part to "flare," if a hole, cut-out, or scarf is located where the bend is made.

"Flare" is an increase in the radius of a bend. It occurs in cut-out or scarfed parts because these areas receive less support



from bottom dies and, therefore, are less sensitive to top, or radius die pressure.

To make bends uniform, flared areas formerly were hammered back to correct radius with mallets. Then Carlton M. Smith, a TEMCO leadman whose home is in Dallas, developed his insert.

It lies across the jaws of the bottom die. It is bent to the same radius as the outside of the part that is being formed. The part lies on top of, and is supported by the insert. This support—around cut-out and scarfed edges—equalizes the top punch pressure along the entire part and allows a uniform bend.

Power brake operators at TEMCO use inserts with nine different radii every day. Though they so far have used inserts only on 48-inch Verson machines forming parts from 2 to 36 inches in length, Mr. Smith points out that the insert may be used on any size brake machine.

CIRCLE INFORM-A-GRAM KEY NO. 156

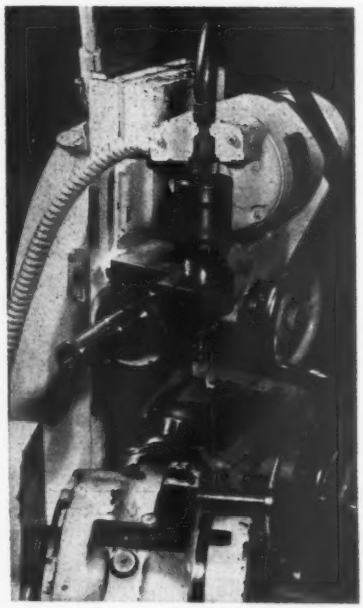
VERTICAL GRINDING ADAPTER

An adapter for the Cincinnati grinding machine which permits it to be used for vertical grinding will save $4,000 a year for Chance Vought Aircraft plant at Dallas, Texas.

The adapter clamps to the main spindle housing and holds the grinder in a vertical position. This allows the grinder to swivel in a direction parallel with the main spindle. This permits tapered helical cutters to be refluted with little trouble and ex-

pedites making of new ones.

Developer of the adapter was J. M. Goodwin. A quarter horsepower air motor equipped with a small cutting stone makes an accurate cut on the helix and rake angle of the spiral tapered end mills. This prolongs the life of these mills by assuring a true cut. They can be resharpened up to eight times instead of the old average of twice. The adapter costs about $100 to make.



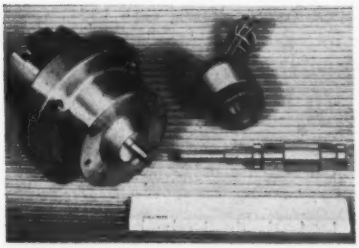
Air-powered grinder adapter clamps to Cincinnati grinding machine, enabling vertical cuts to be made. Tapered helical cutters can be refluted repeatedly, saving $4,000 annually for Chance Vought Aircraft at Dallas, Texas.

Hi-Frequency Motors for Experiment and Production

The Bryant Chucking Grinder Company of Springfield, Vermont, announces the availability of their Hi-frequency motors for experimental and production applications.

Bryant Hi-frequency motors are very simple, compact units. The rotor is mounted directly on the spindle and is the only moving part of the driving motor, since there are no brushes or moving contacts. The stator, carrying the motor windings, is cooled by a water jacket. Lubrication is provided by an oil mist carried in a stream of air. The motor is totally enclosed and remains clean indefinitely. Normally, pre-loaded precision ball bearings are used. However, for certain applications in the higher speed ranges, Bryant has designed special air bearings where the spindle rotates on a cushion of compressed air. The latter construction is used for light loads, and has the advantage of being virtually friction-free.

A new folder is available which gives complete details on the line of Bryant rotating equipment which covers speed ranges up to 150,000 R.P.M. Copies are available free on request. **Circle Inform-A-Gram No. D1.**



Checks Dimensions to HALF-MILLIONTHS!

THE HALF-MILLIONTHS MICRO-AC Electronic Microcomparator is for gage room use and ultra-precision production gaging. It reads .0000005" or .000001" per scale division, either side of center zero — on continuous linear scales, used interchangeably at will. Other sensitivities can be provided for the less-sensitive scale to meet specific requirements.

Frictionless gage-head movement and drift-free amplifier assure *consistent repeat readings.* Other features include fast meter response; easy-to-read scales (half-millionths divisions are 1/10" apart); low contact pressure; and quick set-up.

OTHER CLEVELAND GAGES with the same basic advantages are the PAR-AC Electronic Production Gage and INDI-AC Electronic Indicator. These permit *recording the readings.* The gage heads are often used with *special fixtures,* and for automatic gaging.

WANT DETAILS? Write for illustrated bulletins.

***Best? Ask those who USE them. Names on request.**

Designed, developed and manufactured by

Cleveland INSTRUMENT CO.
735-3 CARNEGIE AVE. CLEVELAND 15, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 157

. . . Equalizer, from page 155

and can be used as components of jigs and fixtures.

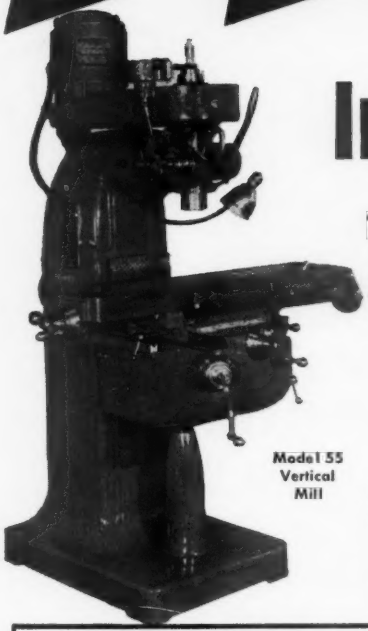
The "compensators" have separate, sliding jaws — one per work-piece in multiple machining — which are backed up by a chamber of "floating" vertical rollers. These rollers shift position to exert equal pressure on each jaw. The jaws are held in the unit by a common key that permits sufficient movement in each jaw for the automatic individual take-up.

The units are available in three types: one for multiple clamping of hard-metal parts, a second for soft material such as aluminum and plastics, and a third that will compensate for draft angle and surface irregularities on castings and forgings. (In the last case relieved sliding jaws are used to apply holding pressure at a number of points on the work-piece.) Many sizes are available in each type. The number of jaws range from 10 to 5, jaw widths from $\frac{3}{8}$" to $1\frac{1}{2}$".

Working parts are close fitting to prevent chips from entering the unit. All parts are hardened, but any or all parts will be provided soft, if desired, along with heat treating data.

CAPACITY + PRECISION + ECONOMY +

Choose INDEX MILLS FOR THESE (+) PLUS ADVANTAGES



Model 55 Vertical Mill

You get more when you buy an Index Mill —more quality, superior features. You are not just buying a machine . . . You are investing in equipment that will deliver better results at lower cost. The ideal machines for all your

MILLING, BORING and DRILLING JOBS

Outstanding in this great line is this versatile MODEL 55 VERTICAL MILL, designed for those extra capacity jobs often found in tool and die shops; provides increased speed and feed range. Capacity ⅛" to 1½" end mills in steel, a table working surface of 32" x 9" or 38" x 9"; overall 40" x 9" or 46" x 9".

MODEL 40 VERTICAL MILL
For speedy, economical milling. Spindle gives 9 speeds, 125 RPM to 2250 RPM. Easy to operate. Rugged, for every day operation; also used for boring and locating. Capacity ⅛" to 1" end mills in tool steel. Table working surface 8" x 26", 8" x 34" overall.

MODEL 60 HORIZONTAL MILL
Simple, efficient, compact, with all operating parts enclosed, yet readily accessible. Unusually low-priced. Designed for the average tool room, yet highly suitable for production shops through its rigidity and low maintenance cost. Standard table 40" x 9", larger table optional.

INDEX BUILDS BETTER MILLS . . . WRITE FOR LITERATURE

INDEX MACHINE CO.

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VISIT OUR BOOTH, NO. 1308, A. S. T. E. SHOW, PHILADELPHIA, APRIL 26-30

CIRCLE INFORM-A-GRAM KEY NO. 158

Drill Point Accuracy Essential to Precision Micro-Drilling

Drilling any kind of an extremely small hole is usually a difficult operation, because of the high ratio of hole depth to drill diameter. Using a 0.15 M/M (.0059") drill to penetrate material only 1/16" thick is

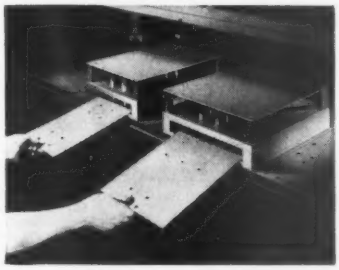
equivalent in this respect to drilling a 1" hole through 10" of material. Such an operation is truly "deep hole drilling", and to do a good job, every element of the design and the manufacture of the drill must be controlled.

If, in addition to merely penetrating, the drill must also produce a hole of close size tolerance, such as a metering orifice in a Diesel fuel injector, the need for accuracy in the drill increases tremendously. The drill's outside diameter, spiral angle, web thickness and flute contour are all critical, but none is more critical than the point itself. The point angle and the point clearance must be right, and most of all, the point must be central.

Whitman & Barnes has disclosed a method of manufacturing drills in the diameter range of 0.15 M/M (.0059") to 1/16" that produces consistently accurate cutting points. In the first place, the flutes of the drill are ground from solid heat-treated blanks. This results in a uniform, close-tolerance tool that is not subject to the distortion of any subsequent heat treatment. At the same flute-grinding operation, the drill is point-ground without removing it from its holder, so that the cutting lips always bear the exactly correct relation both to the flutes and to the axis of the drill.

A New Hole Punching System

A new system offers a simpler, faster, more convenient and economical method of punching holes in sheet metal parts by permitting the entire setup to be made outside the stamping press or press brake. In addition, the punch assemblies and dies are interchangeable, permitting the same parts to be used and reused in an infinite number of setups. This feature makes possible a minimum inventory of parts.



Photos courtesy Wales-Strippet Corp.

Fig. 1. Showing two Wales Multiple Hole Punching Assemblies in a press brake with punched work in foreground.

The Multiple Hole Punching System is available two ways: (1) All individual parts are available for users to stock for assembling hole punching setups. This permits making and putting into operation a hole punching die the same day a templet is completed. (2) Wales-Strippit will build the complete hole punching assemblies ready to operate and guarantee hole location accuracy.

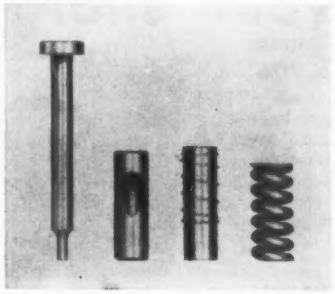


Fig. 2. Showing punch, die, punch guide and stripping spring, all parts of the Multiple Hole Punching System.

Multiple hole punching boxes are available in sizes from 6" x 6" to 24" x 24". Larger sizes made to order. Holes are located and drilled in the punch and die plates of these boxes from a master templet or pattern. Holes may be located over the entire working area of the setup for inserting the punch assemblies and dies. The punch assemblies are inserted in the top plate holes and dies in the bottom plate holes. The punch retainer plate is bolted at the corners of the box, on top of the punches.

The Multiple Hole Punching System is self-contained; no die setting skill required; no adjusting; no aligning is required before or after the setups are placed on the press bed; and nothing is attached to the press ram. Press "down time" is reduced to the few minutes required to lift one setup from the press and replace it with another. Punching starts with the first stroke of the ram.

Fig. 3. Showing box for punch assemblies and dies and punch retainer plate.

For Every Carbide Drilling Application
There's a STANDARD SUPER DRILL
really super!
Six points of superiority—
Result of two years' research. Extensive tests indicate it's the most durable and the fastest cutting carbide twist drill developed to date. Feeds as high as 8" per minute in cast iron have been obtained. Stocked in fractional, wire and letter sizes for your convenience.
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Then check up on Rousselle—for everything about them is aimed at achieving just that.

It took down-to-earth planning, stressing ruggedness and simplicity, along with accurate machining and "close-tolerance" assembly to bring out these rigid, high-output units—THAT COST SO LITTLE—DO SO MUCH—REQUIRE SO LITTLE MAINTENANCE!

That's why they're used throughout industry to shear, punch, bend and form metals; cut and punch paper; form and trim fibre, plastics, etc.

YOU'LL LIKE THE PRICE—when you get our quotation and compare specifications and quality. So let our engineering staff assist you—often they can suggest worthwhile savings—no obligation. Simply explain the problem and send sample or drawing of work.

Rousselle Presses are Sold Exclusively through Leading Machinery Dealers

ROUSSELLE PRESSES

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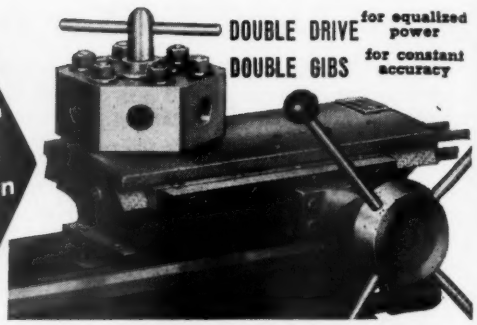
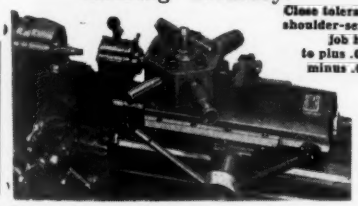
CIRCLE INFORM-A-GRAM KEY NO. 160A

Enco Self-Indexing HEXTURRET For Lower Production Costs and Speedier Output



- √ Custom built to fit all lathes from 9" to 18".
- √ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.
- √ All bearing surfaces hand scraped.
- √ All parts of indexing mechanism hardened, assuring accuracy.



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Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7"x 13"x 16½". Also available bench style. Write for complete and factual information.

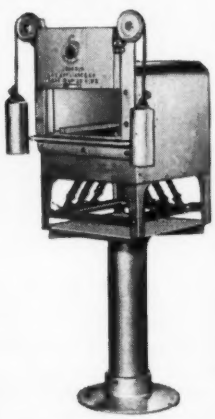
A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.

575 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style	$300.00
Bench Style	$275.00
Johnson No. 654 Pedestal Style	$163.00
Bench Style	$138.00

F.O.B. Factory



Model No. 706

JOHNSON INDUSTRIAL GAS EQUIPMENT

Furnaces • Burners • Torches • Valves • Mixers • Blowers

CIRCLE INFORM-A-GRAM KEY NO. 160C

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Profitable Business is based on new ideas which prove out when put into operation. In a new book that is concerned with reducing costs in

materials handling, the Factory Service Co., 4615 N. 21st St., Milwaukee, Wis., offers 28 pages of ideas for savings in labor, space and equipment.
Circle Inform-A-Gram No. C1.

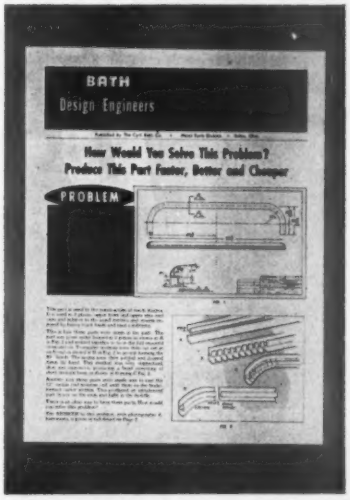
Center Hole Drilling Guide. The Ready Tool Co., 554 Iranistan Ave., Bridgeport 5, Conn., has just released a new master chart to help guide engineers in determining center hole sizes. This chart lists the maximum load on the centers in pounds, ranging from 100 to 300,000 pounds, gives the minimum shaft diameter required and the subsequent center hole diameters that should be used, based upon the predetermined factors.
Circle Inform-A-Gram No. C2.

Metal Cutting. Suggestions and hints for the proper selection and use of hand and power hack saw blades and flexible back band saws are contained in a 28-page pocket-size guide offered by Victor Saw Works, Inc., Middletown, N. Y. Valuable tips on how to choose the right blade for the job and precautions to be taken by the operator are included. Also mentioned are typical problems and their solutions. Specifications also are given for Victor's complete assortment of hand hack saw blades and frames and other products.
Circle Inform-A-Gram No. C3.

"Recommended Coolants and Lubricants for Talide Tungsten Carbide Cutting Tools and Drawing Dies" is the title of Bulletin TB-2 recently published by the Metal Carbides Corp., Youngstown, Ohio. As the title indicates, this is a publication well worth looking into. It contains recommendations for machining all types of steels, ferrous and non-ferrous metals and non-metallic materials as well as lubricants for drawing all types of wire, bars and tubes.
Circle Inform-A-Gram No. C-4.

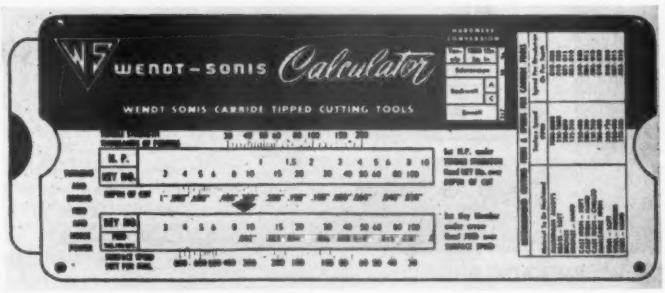
Magnesium Alloy Castings. Rules and recommendations for grinding and polishing this lightest of all metals are contained in Volume 44, Number 12 of "Grits and Grinds," a technical magazine devoted to the interests of better lapping, grinding and surface finishing. It is published by the Norton Co., Worcester 6, Mass. Charts and diagrams assist in making this booklet an extremely helpful Shop Aid. For your copy, write direct to the Company, or—
Circle Inform-A-Gram No. C5.

Stretch Forming Methods. Number 1 of a series of bulletins to be published by the Metal Forming Division of the Cyril Bath Co., Solon,



Ohio, describes how an upper roof cap framing member for motor truck trailers can be formed in a single operation. Photos help depict the operations.
Circle Inform-A-Gram No. C6.

How to Get the greatest possible production return for each dollar invested in machines, men and facilities through an effective visual machine loading system is described in a new booklet recently released by Remington Rand, Inc., 315 4th Ave., New York 10, N. Y. It contains valuable data on effective machine loading systems.
Circle Inform-A-Gram No. C7.



Available Without Charge, the new Wendt-Sonis feed and speed calculator has been simplified for faster, easier use. Suitable for all carbide machining operations, this new calculator has a wide range of feeds-speeds and depth of cut, plus a carbide grade chart. Write to the Wendt-Sonis Co., Hannibal, Mo., or—
Circle Inform-A-Gram No. C8.

INDUSTRIAL NEWS

Rockwell Spring and Axle Company. Two prominent industrialists, Col. Willard F. Rockwell, chairman of Rockwell Spring and Axle Company and Rockwell Manufacturing Company, and Henning W. Prentis, Jr., chairman of Armstrong Cork Company have been elected to the board of directors of American Locomotive Company.

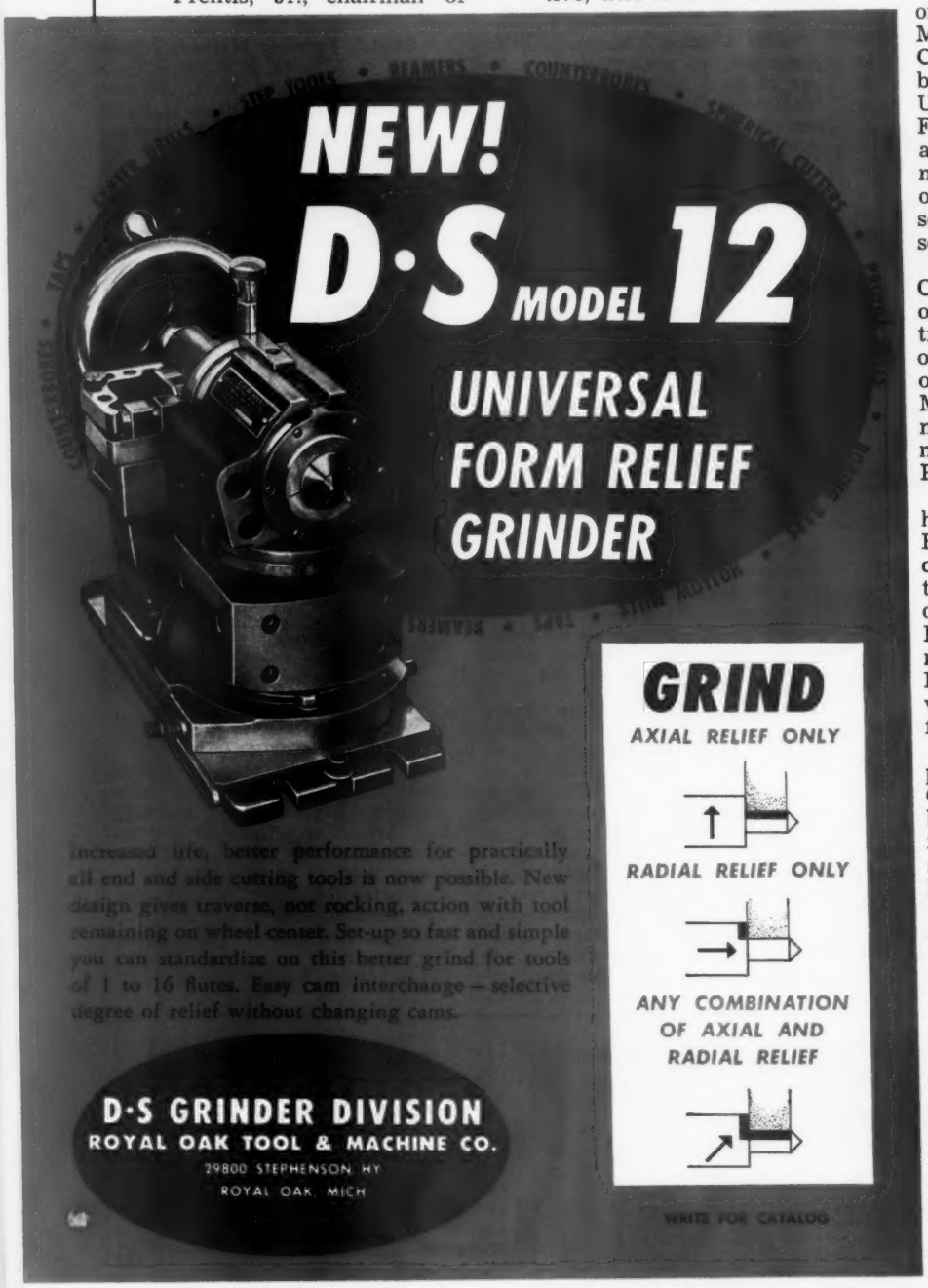
Announcement of the election was made today by Duncan W. Fraser, chairman of American Locomotive, who took the occasion to point out that the company has added six distinguished executives of prominent firms to its board of directors within the past 17 months.

Col. Rockwell is a director of Peoples First National Bank and Trust Company of Pittsburgh; American Mutual Liability Insurance Company of Boston; Pittsburgh Testing Laboratory; United Engineering and Foundry of Pittsburgh. He also is a trustee of the Automobile Safety Foundation of Washington, D. C., representing the parts and accessories industry.

During World War II, Col. Rockwell was director of production for the Maritime Commission, a member of the executive committee of the Army and Navy Munitions Board and a member of the requirements committee of the War Production Board.

Since President Eisenhower assumed office, Col. Rockwell served as a special assistant to the Secretary of Defense on matters of logistics and production. He made three trips abroad recently on behalf of the Defense Department to investigate sources of supply for NATO nations.

Henning Prentis was president of Armstrong Cork Company for 16 years before he became chairman in 1950. Under his leadership, Armstrong Cork widely diversified its business interests and sharply increased its sales and total assets. Mr. Prentis is associated with a number of domestic and foreign subsidiaries of Armstrong Cork Company. In addition, he is a director of Mellon National Bank and Trust Company of Pittsburgh; of the Borden Company of New York; and of the Atlantic Refining Company. He is also a trustee of several universities, a trustee of the Grand Central Art Gallery of New York and has numerous other business and cultural interests.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DIE FILERS
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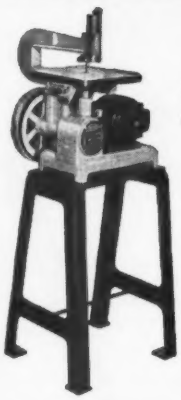

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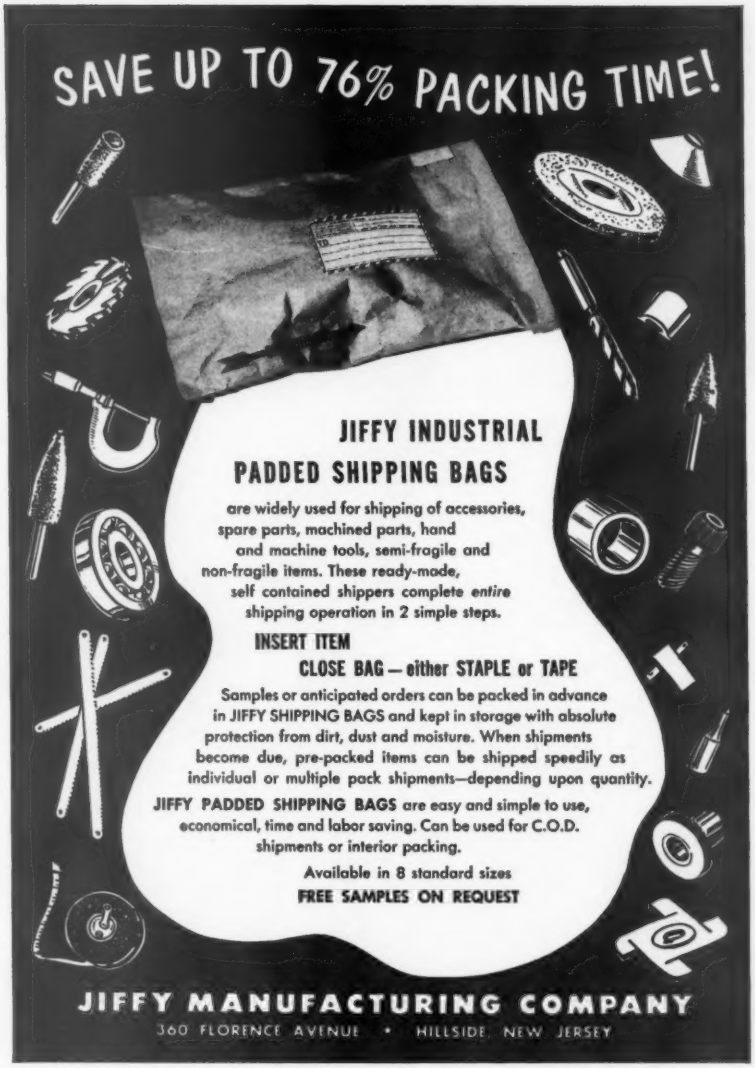

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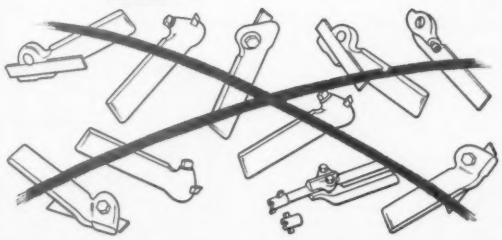

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3	21	39	94	112	128A	136	154	170A	178C	186B	197	211A	217E	224B	229D
4	22	40	95	113	128B	137	155	170B	178D	186C	198A	211B	218A	224C	231
5	23	41	96	114	128C	138	156	170C	179A	186D	198B	211C	218B	225A	232
6	24	42	97	115	128D	139	157	170D	179B	187A	198C	211D	219A	225B	
7	25	43	98A	116	129	140	158	171A	179C	187B	198D	213A	219B	225C	
8	26	44	98B	117	130	141	159	171B	180	187C	200	213B	219C	225D	
9	27	46	99	118	131	142	160A	172	181	189	201	213C	219D	225E	
10	28	61	100A	119	132A	143	160B	173	182A	190A	203A	213D	219E	226A	
11	29	65	100B	120	132B	144	160C	174A	182B	190B	203B	213E	219F	226B	
12	30	66	100C	121A	132.1	145	162	174B	182C	190C	203C	215A	221A	227A	
13	31	67	101	121B	132.2	146	163A	174C	182D	190D	203D	215B	221B	227B	
14	32	68	102	122	132.3	147	163B	174D	183A	191A	204A	215C	221C	227C	
15	33	70	103	123	132.5	148	163C	175A	183B	191B	204B	216A	221D	228A	
16	34	87	104	124	132.6	149	163D	175B	183C	191C	204C	216B	221E	228B	
17	35	89	105	125	133A	150	164	176	183D	192	209A	217A	221F	228C	
18	36	91	108	126A	133B	151	167	177	184	193	209B	217B	222	229A	

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3	21	39	94	112	128A	136	154	170A	178C	186B	197	211A	217E	224B	229D
4	22	40	95	113	128B	137	155	170B	178D	186C	198A	211B	218A	224C	231
5	23	41	96	114	128C	138	156	170C	179A	186D	198B	211C	218B	225A	232
6	24	42	97	115	128D	139	157	170D	179B	187A	198C	211D	219A	225B	
7	25	43	98A	116	129	140	158	171A	179C	187B	198D	213A	219B	225C	
8	26	44	98B	117	130	141	159	171B	180	187C	200	213B	219C	225D	
9	27	46	99	118	131	142	160A	172	181	189	201	213C	219D	225E	
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11	29	65	100B	120	132B	144	160C	174A	182B	190B	203B	213E	219F	226B	
12	30	66	100C	121A	132.1	145	162	174B	182C	190C	203C	215A	221A	227A	
13	31	67	101	121B	132.2	146	163A	174C	182D	190D	203D	215B	221B	227B	
14	32	68	102	122	132.3	147	163B	174D	183A	191A	204A	215C	221C	227C	
15	33	70	103	123	132.5	148	163C	175A	183B	191B	204B	216A	221D	228A	
16	34	87	104	124	132.6	149	163D	175B	183C	191C	204C	216B	221E	228B	
17	35	89	105	125	133A	150	164	176	183D	192	209A	217A	221F	228C	
18	36	91	108	126A	133B	151	167	177	184	193	209B	217B	222	229A	

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A2	A15	A28	A41	A54	A67	B13	B26	B39	B52	B65	C5	E7
A3	A16	A29	A42	A55	B1	B14	B27	B40	B53	B66	C6	E8
A4	A17	A30	A43	A56	B2	B15	B28	B41	B54	B67	C7	E9
A5	A18	A31	A44	A57	B3	B16	B29	B42	B55	67A	C8	E10
A6	A19	A32	A45	A58	B4	B17	B30	B43	B56	B68	D1	
A7	A20	A33	A46	A59	B5	B18	B31	B44	B57	B69	D2	
A8	A21	A34	A47	A60	B6	B19	B32	B45	B58	B70	D3	
A9	A22	A35	A48	A61	B7	B20	B33	B46	B59	B71	E1	
A10	A23	A36	A49	A62	B8	B21	B34	B47	B60	B72	E2	
A11	A24	A37	A50	A63	B9	B22	B35	B48	B61	C1	E3	
A12	A25	A38	A51	A64	B10	B23	B36	B49	B62	C2	E4	
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A2	A15	A28	A41	A54	A67	B13	B26	B39	B52	B65	C5	E7
A3	A16	A29	A42	A55	B1	B14	B27	B40	B53	B66	C6	E8
A4	A17	A30	A43	A56	B2	B15	B28	B41	B54	B67	C7	E9
A5	A18	A31	A44	A57	B3	B16	B29	B42	B55	67A	C8	E10
A6	A19	A32	A45	A58	B4	B17	B30	B43	B56	B68	D1	
A7	A20	A33	A46	A59	B5	B18	B31	B44	B57	B69	D2	
A8	A21	A34	A47	A60	B6	B19	B32	B45	B58	B70	D3	
A9	A22	A35	A48	A61	B7	B20	B33	B46	B59	B71	E1	
A10	A23	A36	A49	A62	B8	B21	B34	B47	B60	B72	E2	
A11	A24	A37	A50	A63	B9	B22	B35	B48	B61	C1	E3	
A12	A25	A38	A51	A64	B10	B23	B36	B49	B62	C2	E4	
A13	A26	A39	A52	A65	B11	B24	B37	B50	B63	C3	E5	

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The John Deere Plow Works of Deere & Company formerly used cast grey-iron dies to swage AISI 1070 F steel plow beams. Die life was, at best, a mere six weeks or about 8,000 parts.

They switched to A-L CAST-TO-SHAPE swaging dies of FCC No. 66 tool steel, hardened and drawn to 57-58 Rockwell "C". The new dies ran *fourteen months*—eight hours a day, five days a week—before redressing was necessary. Approximately *83,875 Parts* (over ten times the production) were swaged in that period! Production has been maintained at that level since.

You, too, can save time and money with the modern FCC CAST-TO-SHAPE method of tool and die making. Don't forget, you also buy *less* steel and reduce machining costs. It's a matter worth investigating. ● Check with your A-L representative TODAY . . . or write *Allegheny Ludlum Steel Corporation, Oliver Building Pittsburgh 22, Pennsylvania.*

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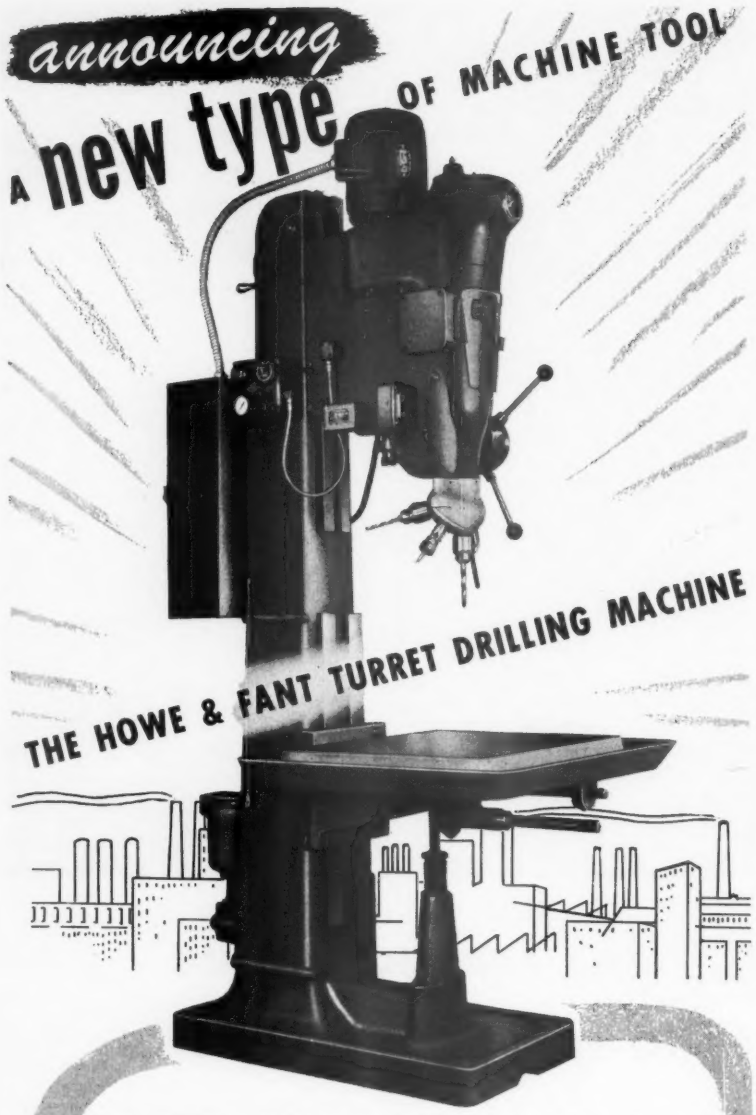

The HOWE & FANT Turret Drilling Machine is a revolutionary development that does for drilling what the modern turret lathe does for turning.

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HOWE & FANT, INC.
33 Fitch Street, East Norwalk, Conn.

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A.S.T.E. Industrial Exposition, Philadelphia, April 26-30
Or Write for Bulletin 5403

CIRCLE INFORM-A-GRAM KEY NO. 168

. . . Drill Units, from page 98

2. Sub-bases in three sizes (one for each unit) to permit special-purpose machines incorporating the units to be built in such a way that the units can be easily moved back for tool changes, etc., without disrupting accurate machine alignment.

3. Back-feed valves which adapt units for tapping, threading, back spot facing or any operation requiring feed on the back stroke rather than rapid retraction as in normal drilling.

As a result of these improvements and the rapidly increasing need for production economies, we expect our sales to climb above 85% this year following an increase in output of about 100% in 1953.

An Automatic Lathe for Carbide Tooling

A new high powered automatic turret lathe, designed primarily for rapid removal of metal

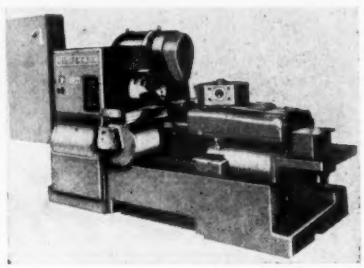


Photo courtesy Potter & Johnston Co.

with modern carbide tools, has been put on the market.

The machine is designed so that the following attachments can be easily applied: Slow spindle speed for drill head pick-up; slow spindle speed for spindle positioning; and reversing spindle for right or left threading with automatic tap withdrawal.

Four automatic instantaneous speed changes are provided and through pick off gears, spindle speeds ranging from 45.5 to 1177 rpm can be obtained. A large magnetic clutch and brake, designed to give cushioned starting and stopping of the spindle, allows greater flexibility in operation. These features together with a 25 hp motor enable the machine to take full advantage of modern carbide tooling thus assuring fast metal removal on the toughest materials.

. . . Developments, from page 94

overloads and automatic shutdown.

These features are inherent with properly designed systems, which also prove less costly because of greater simplicity, dependability and efficiency in operation.

The Denison Multipress has a proven record on such operations as peening, forming, broaching, stamping, flaring, and many more. This is an outstanding example of the application of fluid power to production equipment. All of the advantages of hydraulics are incorporated to make this machine fast acting, efficient, and dependable.

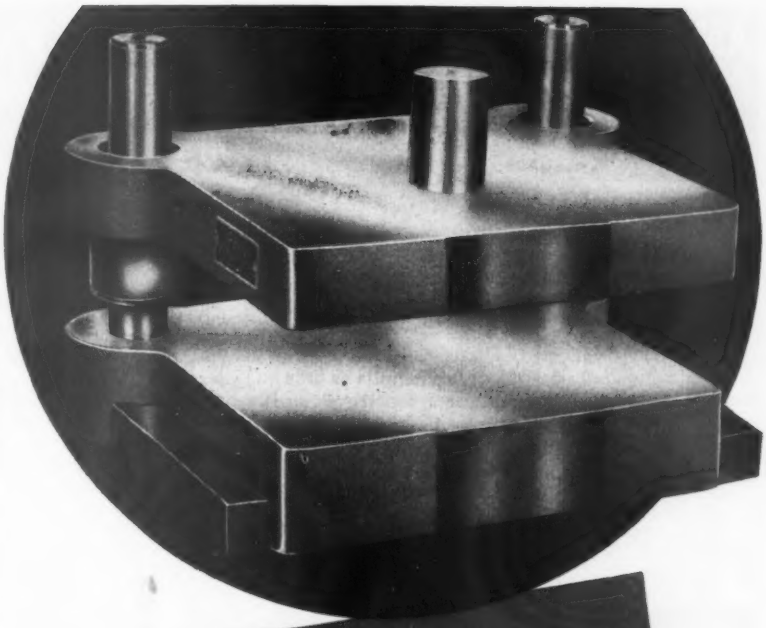
Nord Opens Plant In Orange, N. J.

Nord International Corp. Denville, N. J. has opened a two-story brick and stucco plant located in Orange, N. J. where the main office will now be located in addition to the experimental and development departments.

Plans are also being made to concentrate service upon the full line of Nord Products at this location which will include repair of such items as Nord Nibblers, Di-Profilers, Nibblex units, cutters, dies, etc.

Parts production from plants in New England, New Jersey and imports from Sweden will be assembled here and some additions to the industrial, motor service and home workshop lines, now being developed and tested are to be announced shortly.

Get the information YOU want conveniently and quickly — use a TOOLING and PRODUCTION INFORM-A-GRAM CARD — page 165.



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Inexpensive and simplest of all print making equipment! Thousands in daily use. Enables anyone to make accurate, positive whiteprints from translucent originals. Saves up to 80% of commercial blueprint costs—quickly pays for itself! Makes photocopies, too. Just plug in. Uses diazo (moist or ammonia dry) process. Complete portable *Spee-Dee* outfits in 12″ x 18″, 18″ x 24″ and 24″ x 36″ models. Prices start at $55.00. Also a full line of 42″ width capacity volume production whiteprinters at moderate prices.

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PECK & HARVEY

Mfrs. of Whiteprint, Blueprint & Photocopy Equipment

5642 NORTH WESTERN AVE., CHICAGO 45, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 170A

There's a reason 76%* of all popularly-priced Tool and Cutter Grinders sold in 1952 were "Knock-Outs"

MODEL B860

Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

Distributed Only Through Franchise Dealers

K. O. LEE CO.
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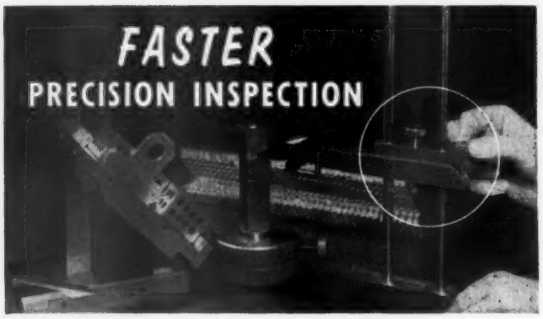
See Us at Booth 1972, ASTE Show, Philadelphia, Pa.

CIRCLE INFORM-A-GRAM KEY NO. 170C

FASTER PRECISION INSPECTION



TTCO INDICATOR HEIGHT GAGE

Inspectors—toolmakers—save time and money. Get faster, more accurate inspection with the new, versatile Tietzmann Indicator Height Gage. Positive final adjustments in millionths easily and quickly made with one hand. No more eyestrain doing scribing work. Supplied with indicator holder and scribing attachment in three sizes.

Adjustable inspection block eliminates trial and error readings of the height gage. Adjustable in millionths through a range of .250″ vertically. 1¾″ anvil quickly raised and lowered with a micrometer thread screw.

Use both products together for accurate production inspection. Write for Bulletins 140 and 150.

TIETZMANN TOOL CORPORATION

314 MAIN STREET • ENGLEWOOD, OHIO

CIRCLE INFORM-A-GRAM KEY NO. 170B

POLISH • GRIND • BURR • SHARPEN IN SECONDS...WITHOUT TEARING DOWN SET-UPS

Do It Faster With A DREMEL MOTO-TOOL

Dremel Moto-Tools are used in many different types of industries by thousands of diemakers, machinists and hobby craftsmen for polishing and grinding dies, burring parts, sharpening cutters, etc. A money-maker and time-saver, the Moto-Tool does close work in seconds without tearing down costly production set-ups.

APPROXIMATELY 27,000 R.P.M.

MOTO-TOOL NO. 2, with one emery wheel point $17.85

MOTO-TOOL KIT NO. 2, with 23 accessories (high speed steel cutters) and Model 2 Moto-Tool in sturdy steel case $25.95

GRINDING

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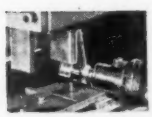

BURRING

See Your Nearby Industrial Distributor or write for catalog.

DREMEL MFG. CO., Dept. 524-D, RACINE, WIS.

CIRCLE INFORM-A-GRAM KEY NO. 170D

Will You Be There?

April 12-15. Society of Automotive Engineers, Inc. Aeronautic Meeting and Forum. Hotel Statler, New York City.

•

April 14-16. Society for Experimental Stress Analysis. Spring Meeting. Hotel Netherland Plaza, Cincinnati.

•

April 19-20. Symposium on Automatic Production of Electronic Equipment, co-sponsored by Stanford Research Institute and the U. S. Air Force. Farimont Hotel, San Francisco.

•

April 21-23. Conference on Feedback Control Systems, American Institute of Electrical Engineers. Hotel Claridge, Atlantic City.

•

April 21-24. National Screw Machine Products Association. Annual Meeting. Hotel Statler, Detroit.

•

April 26-28. Metal Powder Association. Annual Meeting. Chicago.

•

April 26-30. American Society of Tool Engineers. Industrial Exposition and Annual Meeting. Philadelphia.

•

April 29-30. Society for the Advancement of Management. Time Study and Methods Conference. Statler Hotel, New York City.

•

May 4-7. American Welding Society. Exposition and Spring Technical Meeting. Buffalo, N. Y.

•

May 8-14. American Foundrymen's Society. Annual Convention. Cleveland.

•

May 16-20. Basic Materials Exposition and Conference. Clapp & Poliak. Chicago.

•

May 24-27. Symposium on Instrumentation, Institute of Industrial Health, University of Michigan. Ann Arbor, Mich.

•

June 7-10. Society of the Plastics Industry. National Plastics Exposition and Technical Conference. Public Auditorium, Cleveland.

•

June 16-18. High Vacuum Symposium, Committee on Vacuum Techniques. Berkeley Cartaret Hotel, Asbury Park, N. J.

Wilton's PowRarm

HELPS ONE MAN DO THE WORK OF TWO

You'll discover—as have the nation's most important manufacturing firms—that the Wilton PowRarm saves time, cuts costs, reduces worker fatigue. There's a PowRarm work positioner for every job—investigate today!

ON MACHINES
As used by International Business Machines Corporation, Poughkeepsie, New York, plant.

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As used by General Electric Company's Major Appliance Division, Erie Works.

ON WORKBENCHES TOO

Model No. 301

For full details, just send this ad in with your letterhead.

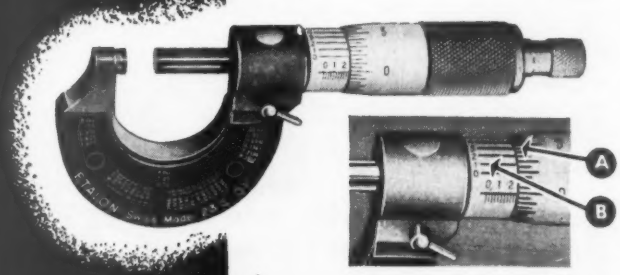
WILTON TOOL MANUFACTURING CO. INC.
DEPT. TP-4 941 Wrightwood Avenue, Chicago 14, Illinois

CIRCLE INFORM-A-GRAM KEY NO. 171A

ETALON 23c

Reads to .0001 of an inch

ETALON is the product of over 50 years of Swiss precision craftsmanship . . . the most revered name in precision metrology. Smooth-operating; microscopically accurate; ruggedly built for lifetime service.



THE ONLY MICROMETER GRADUATED IN THOUSANDTHS AND HALF-THOUSANDTHS OF AN INCH

A Half-thousandths graduations on thimble allow tenths readings with only 5 Vernier graduations.

B Deep, machine divided graduations on both thimble and barrel assure easy reading under most lighting conditions.

Forged Frame
One-piece stainless steel spindle
Heavy Duty Tungsten Carbide measuring faces, optically lapped.
Quick acting positive lock
Feather touch friction stop eliminates wear, assures sensitive "feel."
Dull chrome finish on thimble and barrel eliminates glare.

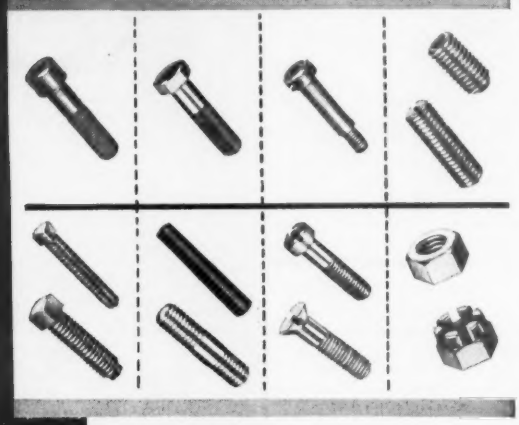
F.O.B. New York **$18.75**
ASK YOUR DEALER or write:

ETALON P.KOCH ROLLE Suisse

ALINA CORP. 401 BROADWAY, New York 13, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 171B

Cut Assembly and Production Costs with "CHICAGO" Standard Threaded Products



For whatever purpose, production or maintenance, "Chicago" Threaded Products for 82 years have been precision made to assemble faster with less "on the job" trouble.

Specify standard sizes for faster deliveries, greater savings over "specials" and less downtime. Our more complete stocks mean "at once" shipments when you need them—no production delays—no maintenance "shut downs"—no large inventories necessary.

The "Chicago" line of threaded products is a complete line, available from the stocks of your service-conscious Industrial Supply dealer—in bulk or in packages for original equipment or replacement. Ask him for samples—he will gladly supply them.

This new 36-page catalog tells the whole story of the "Chicago" complete line of threaded products. Ask for your copy today.

All "Chicago" Screw Products come packed in strong, easier-to-see packages. Color coded labels mean faster selection, greater savings of time in your stockrooms.

HIGHLIGHTS OF THE "CHICAGO" LINE:

★ High Carbon Heat Treated Cap Screws give added wearing qualities due to uniform hardness through entire thread structure. Ideal for all heavy-duty equipment.

★ Larger size Hexagon Head Cap Screws than normally stocked are available for immediate shipment.

★ Anti-corrosive "Chicago" stainless steel and brass fasteners in a large range of sizes and styles available for immediate shipment.

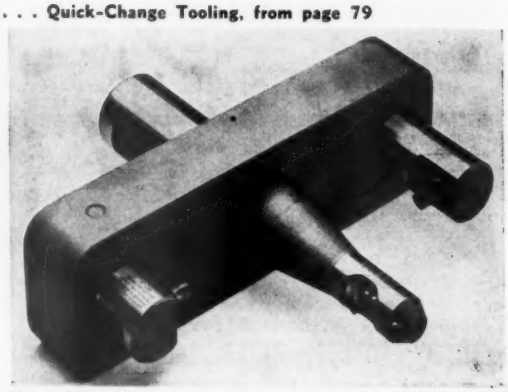
The CHICAGO SCREW COMPANY

2519 W. Washington Boulevard
Bellwood, Illinois

"SAFETY PLUS" Socket Set Screws, alloy and stainless • Socket Head Cap Screws, alloy and stainless, Flat Head, alloy • Socket Head Stripper Bolts • Socket Pipe Plugs • Square Head Dog Point Set Screws • Socket Keys and Key Kits • "CHICAGO" Hexagon Head Cap Screws, bright, heat treated, stainless and brass • Square Head and Headless Set Screws • Fillister and Flat Head Cap Screws • Milled Steel Studs • Hexagon Nuts, steel and brass • Castle Nuts • Taper Pins

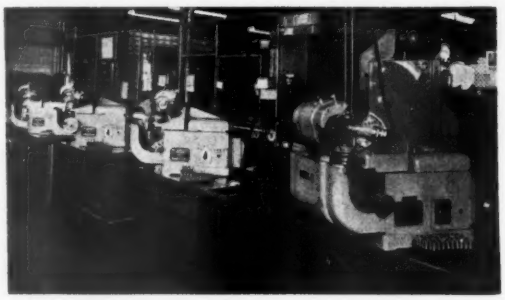
CIRCLE INFORM-A-GRAM KEY NO. 172

. . . Quick-Change Tooling, from page 79



These Microbore units running on a precision boring machine, machine four surfaces at one pass, i.e., one bore, two outside diameters, and one face. Workpiece is an aluminum die cast dynamometer end bracket.

Another example of the versatility and flexibility of Microbore tooling comes from The Apex Electrical Manufacturing Company, Sandusky, Ohio. There, 19 different aircraft engine starter and generator parts are interchangeably accommodated by any of six identical Bore-Matics. Because the tools and fixtures for these parts are quickly and easily taken off or replaced it makes little difference whether the production runs are long or short; all six Bore-Matics could be doing the same job or all entirely different ones. In the machining of the different parts they rotate the work or they hold it stationary and rotate the tools according to which method is most practical.



This line of Heald tool grinding machines is used for the finish grinding of the Microbore carbide tips after brazing. A fast production setup has been developed to handle a wide range of tool sizes and tips.

For Your Future

U. S.

SAVINGS BONDS

SEE IT AT THE SHOW!

On display and in operation for the first time at the Tool Engineers Exposition — the newest U. S. Automatic Coil Cradle! If you are interested in press room "automation" . . . in making your press room operations faster and more efficient . . . be sure to visit the display of U. S. Automatic Equipment at Booth 1254.

This cradle has a capacity for material up to 9 inches wide, in coils with an O. D. up to 40 inches. It is equipped with two coil rest rolls mounted on self-aligning roller bearings. A pair of hardened and ground power-driven take-out rolls unwind the material to the very end of the coil. The ¼ HP geared motor provides output up to 52 feet per minute, and is started and stopped through a mercury switch loop control. Motors can be furnished to provide even higher output if required.

The unit has been designed so that it is a simple matter to place a coil in position without raising it to a considerable height or removing and replacing retaining arms, as would be necessary if a stock reel were used.

If you have a press room — and press room problems — be sure to visit Booth 1254. See U. S. Automatic Press Room Equipment in operation; talk to our engineers, and see if they can't suggest profitable, practical solutions to some of your production problems.

The following U.S. Press Room Equipment will be on display and in operation at Booth 1254, ASTE Exposition, Philadelphia, April 26 - 30.

U. S. Automatic Coil Cradles

U. S. Slide Feeds

U. S. Plain Stock Straighteners

U. S. Power Driven Straighteners

U. S. Scrap Chopper

U.S. TOOL COMPANY, Inc.

AMPERE (East Orange) NEW JERSEY

CIRCLE INFORM-A-GRAM KEY NO. 173

new BOICE dial snap gage

REDUCES OPERATOR FATIGUE

BOICE Dial Snap Gage size 0"-1"

The BOICE Dial Snap Gage has been carefully designed for optimum balance and legibility with operator fatigue an uppermost consideration. The gage is available in sizes 0" to 4" each with a 1" range. It can be supplied with a selection of indicators.

Write for Bulletin 6B

BOICE MANUFACTURING COMPANY, INC.
STAATSBURG, NEW YORK
DIAL GAGES BY BOICE "INDICATES QUALITY"

"VISIT US AT BOOTH 341 IN PHILADELPHIA"
CIRCLE INFORM-A-GRAM KEY NO. 174A

IMPORTANT NOTICE

The Genuine MAUSER VERNIER CALIPER

IS NOW MADE OF STAINLESS STEEL THROUGHOUT

The fine finish will not tarnish or deteriorate in many years of use.

NEW #101

$14.75 POSTPAID

. . . AND THE FOLLOWING IMPROVEMENTS HAVE BEEN ADDED

★ A SPECIALLY LONG VERNIER to read the thousandths
★ A HARDENED PHOSPHOR-BRONZE adjustable gib retains accuracy
★ 3 EASY READING SCALES • 1/1000" • 1/128" • 1/10 mm. in back

Request Illustrated Folder showing complete line of MAUSER Toolmakers Calipers, Height gages, Bevel Protractors and Tool Stands.

Dealers: Here's a real profitable line!

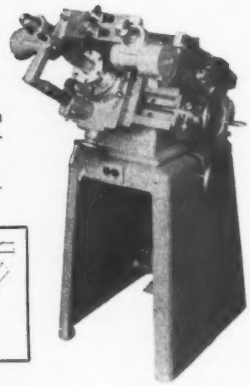
GEORGE SCHERR CO., INC.
COMPLETE LINE OF PRECISION INSTRUMENTS
200-T LAFAYETTE ST. • N.Y. 12, N.Y.

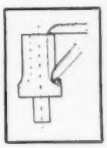
SEE US AT BOOTH 516 - ASTE SHOW - APRIL 26 TO 30
CIRCLE INFORM-A-GRAM KEY NO. 174B

Punches Shaped from the SOLID with OTTMANN Punch Shaper

FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.





5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.

Write for Literature

CEDAR-WEST TOOL CO., INC.
90 WEST ST. NEW YORK 6, N. Y.

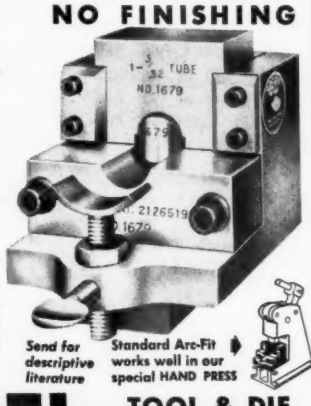
CIRCLE INFORM-A-GRAM KEY NO. 174C

Notch 12 PIPE ENDS per MINUTE

Make Perfect Joints for Welding or Brazing

ARC-FIT
REG. U. S. PAT. OFF.

NOTCHES CLEAN NO FINISHING



Standard ARC-FIT in hand or power press shears contours for "T" joints for ½" to 2" pipe or tubing with easily interchanged dies.

Special ARC-FITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.

Send for descriptive literature

Standard Arc-Fit works well in our special HAND PRESS

VOGEL TOOL & DIE CORPORATION
1817 N. 32nd AVE. • MELROSE PARK, ILL.

CIRCLE INFORM-A-GRAM KEY NO. 174D

Gisholt Executives Inspect Restyled Balancer

This is the first machine of the improved and restyled line of Dynetric Type S Balancing Machines as announced by the Gisholt Machine Company of Madison, Wilconsin. Shown inspecting this Model 3S machine are company officials. At the left is Werner I. Senger, Vice President in Charge of Balancing. At the right is George H. Johnson, President and Alfred B. Morey, Vice President and Treasurer. The line of Type S machines include four floor models, two vertical models and two bench models. Rotating parts weighing from 4 ounces to 300 pounds are covered by these machines.

Now... From one outstanding source!

All Your Diamond Abrasive Requirements

THE Star Dust LINE!

A COMPLETE RANGE OF LABORATORY GRADED DIAMOND ABRASIVES FOR EVERY PURPOSE

STAR DUST DIAMOND WHEELS AND HONES
Superior diamond quality combined with new bonding formula.

STAR DUST Laboratory graded Pure Diamond Powders

STAR DUST Laboratory graded diamond lapping compounds in 18 gram applicator gun—or in 5 gram ophthalmic tipped tube.

You can put your confidence in the STAR DUST line as so many others do because STAR DUST quality is consistent quality—the result of our special process of laboratory crushing and grading to achieve uniform nodular shape. That means *all* particles work for you. Be "Laps Ahead." For easier grinding and mirror finishes specify STAR DUST products.

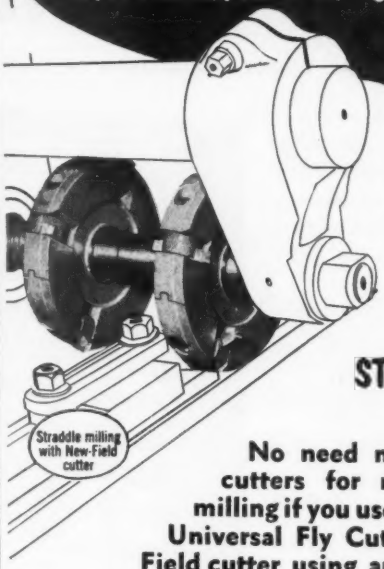
For complete information and catalog write Dept. C-13

ACE ABRASIVE LABORATORIES

NEW ADDRESS: 35 ROSELLE STREET, MINEOLA, N. Y.

CIRCLE INFORM-A-GRAM KEY NO. 175A

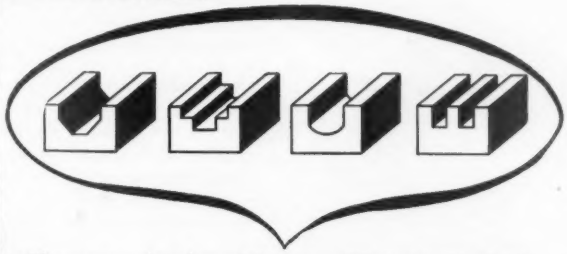
New-Field UNIVERSAL FLY CUTTER



MAKES 4-6 CUTS IN ONE OPERATION!

USES STANDARD BITS!

No need now for special cutters for many types of milling if you use the New-Field Universal Fly Cutter. One New-Field cutter using any type of high speed steel or carbide bits makes multiple cuts in one operation. Standard bits are easily reground or replaced when needed for other work. Down time is cut to minimum.



These are only a few of the many different types of cuts possible with a New-Field Universal Fly Cutter.

The cutter fits all standard arbors and turns at any required speed for fly cutting, slotting, straddle and form milling, face milling, boring, and flat surfaces. Available in 4", 6", 8" and 10" sizes, also 6" and 8" heavy duty size designed especially for Shell End Mill Arbors. Write today for details on this versatile, money-saving tool!

NEW-FIELD MACHINED PARTS CO.

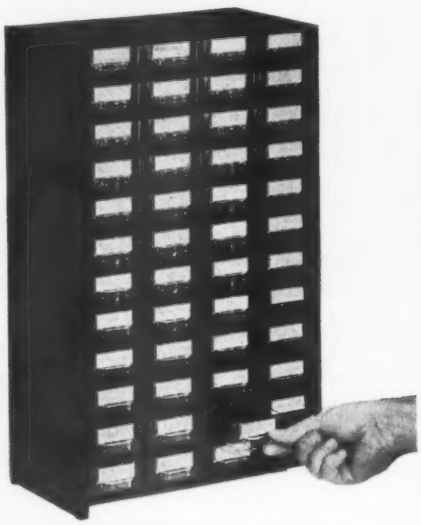
210 W. 7th St., Los Angeles 14, Calif.
Export office: States Trading Co., 401 Broadway, N. Y. 15
Cable: STRADESO, New York

CIRCLE INFORM-A-GRAM KEY NO. 175B

Plastic DRAWER JIFFY CABINETS

THE BEST WAY TO PUT SMALL ITEMS IN THEIR PLACE!

In every home, in every office, in every shop, there are dozens of small parts requiring easy, convenient storage. The slickest, handiest answer to this problem is the JIFFY Cabinet.



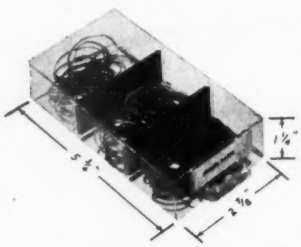
Illustrated — 48-drawer JIFFY Cabinet, red frame with crystal-clear styrene drawers.....only $19.95*

CHECK THESE FEATURES:

• **3 New Color Combinations**
Cocoa Brown with tan drawers.
Black with gray drawers.
Red with crystal-clear drawers.

• **Solid One-piece Back Panels**
Keep dust out . . . maximum strength girder type construction . . . ready-made keyhole slots for handy wall mounting.

• **Rubber-tipped Cabinet Feet**
Prevent scratching . . . increase stability . . . make stacking convenient.



• **Generously Sized Drawers**
More than 18 cubic inches in each one . . . full set of index labels and drawer dividers supplied with every cabinet.

Inside of drawer easily divided into three compartments with metal dividers as illustrated. Each drawer has a stop to prevent accidental spillage and to permit drawer to hang open from back edge. Ribbed runners on bottom of all drawers permit them to slide freely. Index slots on front of drawers allow easy identification of contents.

HANDY PRODUCTS, P. O. BOX 2447, CLEVELAND 12, OHIO

Please send immediately the quantity, size and color JIFFY units as listed:

☐ 48 Drw. @ $19.95* ☐ 32 Drw. @ $12.95* ☐ 24 Drw. @ $9.95* ☐ 16 Drw. @ $7.95*

☐ Red w/clear drwrs. ☐ Black w/gray drwrs. ☐ Brown w/tan drwrs.
(NOTE: If color is not specified, we will ship Red Cabinet w/clear drwrs.)

WE PAY ALL SHIPPING COSTS

NAME.....
COMPANY.....
STREET.....
CITY.....ZONE.....STATE.....

Open account shipments on company purchase orders. Otherwise, check with order, please. No C.O.D.'s, please. *Ohio customers add 3% sales tax.

Broach Handling Eliminated in Two Pass Broaching

Increased production and reduced handling are the direct benefits of an ingenious broach handling arrangement developed by Colonial Broach Company, of Detroit. This setup, on a Colonial 50-ton, 72-inch stroke, pull-down

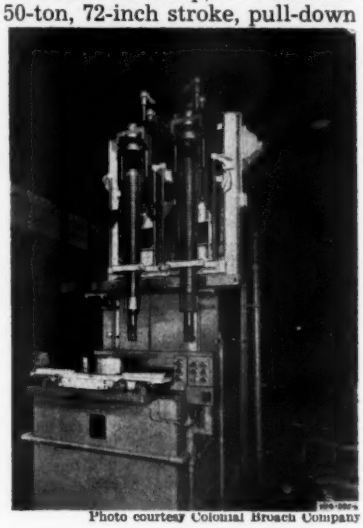


Photo courtesy Colonial Broach Company

Fig. 1. Typical internal broaching operation using Colonial dual sliding broach handling support on a Colonial, 50-ton, 72-inch stroke, pulldown broaching machine. At start of fully automatic cycle receding work table moves into cutting position and broach at left is pulled through for roughing and semi-finishing pass. Length of cut is 5 inches. Broaches are 5.625 inches pitch diameter, 36 spline, 6 inches O.D.

broaching machine, enables large components requiring two passes, to be broached internally from start to finish with minimum handling. It can be used for internal broaching of involute splines, straight splines, squares, rectangles and irregular shapes, etc.

Normally such parts are put through a roughing and semi-finishing pass, stacked near the machine and then finish broached after the broaches are changed. This means that the parts must be handled four times: Into the machine for the first pass, out of the machine for stacking, back into the machine for the second pass and, finally, out of the machine after they are finished. It is inconvenient and expensive to handle large, heavy parts this often. In addition, changing broaches is time con-

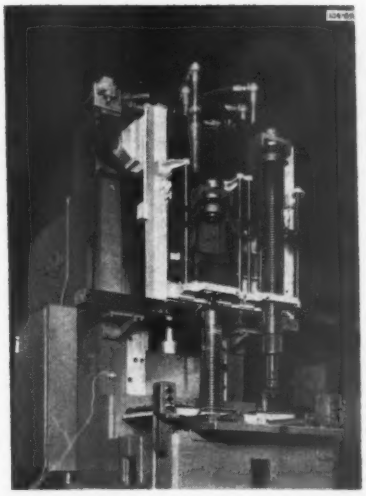


Fig. 2. Work table shown in cutting position during initial pass. At end of cutting stroke, table and broach is returned to handling puller. Handling pullers are equipped with safety interlocks which prevent shuttling of broach handling mechanism unless broaches are in proper handling position.

suming and requires care to prevent damage to the cutting edges.

Automation for Tools Instead of Work

A major improvement in efficiency results from the installation of Colonial's dual sliding broach handling support. The workpiece to be broached is placed in position on a hydraulically actuated receding table and requires no further handling until completion of the automatic cycle. The finished part is then removed and sent along to the next manufacturing operation.

To start the cutting cycle, the operator must depress buttons at both sides of the machine, guaranteeing that both hands are clear of the machine. Once the cycle is started the following sequence is automatic: 1. Receding fixture brings the part into cutting position, (Fig. 1); 2. Initial pass broach is pulled through part, (Fig. 2); 3. Fixture recedes to clear broach; 4. Broach is returned to handling puller at top of machine; 5. Dual sliding broach handling support shuttles to the left carrying the second pass (finishing) broach into cutting position.

Finishing The Job

The table moves into cutting position and the second or finishing pass is identical to the initial pass, (Fig. 3), including return of the broach to hand-

. . . Continued on page 180

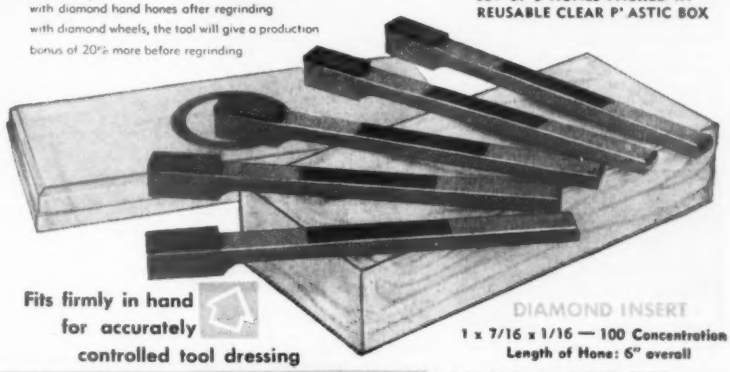
GIVE YOUR CARBIDE TOOLS "THE BONUS EDGE"

20% LONGER TOOL LIFE BETWEEN REGRINDS

Diamond hand hones with "finger-tip" control

If the edge of a carbide tool is properly honed with diamond hand hones after regrinding with diamond wheels, the tool will give a production bonus of 20% more before regrinding

SET OF 5 HONES PACKED IN REUSABLE CLEAR PLASTIC BOX



Fits firmly in hand for accurately controlled tool dressing

DIAMOND INSERT
1 x 7/16 x 1/16 — 100 Concentration
Length of Hone: 6" overall

DIAMOND GRIT SIZE

for all general shop requirements
SINGLE END.....

No.	SINGLE END		
1	100	$73.50	In lots of 6 sets $5.00 off per set
2	150		
3	220		
4	320		
5	400		

complete range for all tool cutter finishing
DOUBLE END.....

No.		DOUBLE END		
6	100	320	$130.95	In lots of 6 sets $7.50 off per set
7	150	320		
8	220	320		
9	400	320		
10	600	320		

United States Diamond Wheel Company offers constant fine quality in its complete line of diamond grinding wheels for giving your carbide tools "the BONUS edge".

Scientifically controlled bonds perfected to do the best cutting job consistently, economically.

Send for catalog showing complete line of products

UNITED STATES DIAMOND WHEEL CO. AURORA, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 177

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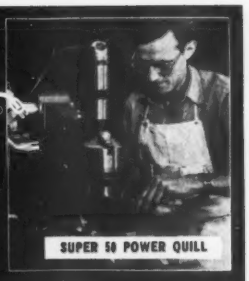
LOWEST COST PRECISION

FOR TOOL ROOM AND PRODUCTION



UP TO 45,000 R.P.M. AND ¼ H.P. ON AC/DC. Only PRECISE has the speed, power and precision needed to turn *Tungsten Carbide Mills* as well as all other rotary tools with shank diameters to ¼". Grind, mill, finish, polish any material from wood to the hardest alloy steel. MODELS SUPER 30 and SUPER 40 are for hand applications or machine set-ups; PRECISE SUPER 50 is for heavy duty in machine set-ups. Precision quills and chucks; lifetime-lubricated, micro-precision bearings; machined metal housings. Mounts and accessories for each model extend versatility on standard machine tools.

New

PRECISE SUPER 30 45,000 R.P.M. and ⅛ H.P. in 35 oz. Draw collet.

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PRECISE PRODUCTS CORP. 1341 Clark St., Racine, Wis.

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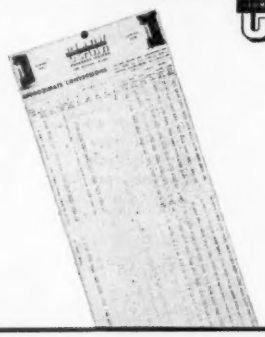
HARDNESS CONVERSION CHART

For Every Shop That Does Hardness Testing

This latest and most nearly accurate Hardness Conversion Chart is a necessity wherever hardness testing is done. It has been compiled and produced by CLARK, makers of the internationally respected CLARK Hardness Tester for "Rockwell Testing." Printed on heavy stock convenient for wall mounting, the chart is offered free of charge to hardness tester users. Just attach this ad to your letterhead or write "Send wall chart." A copy will be mailed to you without charge or obligation.

P.S. If you would also like information on CLARK Standard and Superficial Hardness Testers, we'll be glad to send that along too.

CLARK



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10208 Ford Road
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TEST HARDNESS OF ANY SIZE, SHAPE, TYPE METAL . . .

anywhere . . . in one easy motion!

This 30 oz., 3 in. high tester, in 30 seconds, gives direct dial readings on the job. Just press handgrips, read dial.

Accuracy guaranteed by individual calibration available in:

Rockwell "A" 35-75 Scale	Rockwell "15N" 70-95 Scale
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Now! Bench stand for mass production testing.

Write today for Booklet ET 495 or demonstration in your shop.

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portable metal hardness testers
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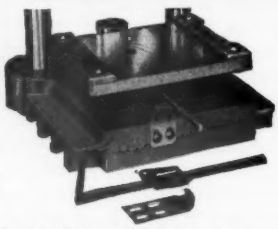
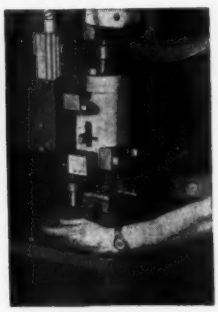
Adjustable Automatic Stock

FEED STOP for DIES

Dahlstrom Light Duty

AUTOSTOP





No drill jig . . .
No slotting . . .
No milling . . .

$1.75

Tested and improved through the years, the Dahlstrom Autostop will save hours of your high priced labor. Adjustable to work with blanking, progressive and compound dies. Mounts on stripper plate in 15 minutes. Handles sheet steel up to 1/16" x 6" or equivalent weight.

TO INSTALL: Just drill one 7/32-inch hole, then drill and tap four mounting holes per directions. That's all there is to it!

Trial order $1.75 each; lots of 12 $1.50 each. State whether for use on compound or progressive dies. *Write for free pamphlet.*

By the makers of the DAHLSTROM TAP GUIDE

Branch MANUFACTURING COMPANY
NORTH BRANCH • MINNESOTA

CIRCLE INFORM-A-GRAM KEY NO. 178D

Carbide Cutters Boost Thread Milling 300%

Thread Milling of ball raceways in actuating nuts is today being handled efficiently and economically with tungsten carbide-tipped cutters at the plant of Vard, Inc., of Pasadena, Calif., nationally known manufacturers of Ball Screw actuators and Hour-Glass worm-gear assemblies. Cutters used in this process are produced in various diameters and tooth radii in Vard's own tool room.

Typical operation is on an SAE 8620 (70-90,-000 psi tensile strength) steel main-gear actuating ball nut in which the raceway's major diameter is 3.062-inch. Sixteen and three-quarter turns or threads are milled in the raceway at 18 IPM (rotation of workpiece), 0.0045-inch chipload per tooth, 328 rpm (rotation of cutter), and 0.100-inch depth of cut. Approximately 0.007-inch stock is left for finish grinding after heat treating. Their carbide cutter turns clockwise while the workpiece is turning counter-clockwise.

Equipment First Overhauled and Modified—Machining is done on a Shields thread mill modified with a 100-pound flywheel on one end of the quill through which the coolant is piped directly to the cutter. A combination faceplate and pot chuck is used for holding the workpiece. This equipment was overhauled to minimize backlash and bearing play, and

. . . *Continued on page 183*

Photo courtesy Kennametal Inc.

Thread milling ball raceways in actuating nuts is done efficiently and economically in a Shields Thread Mill with Grade K4H-tipped-cutters.

Typical operation is on a 8620 steel gear actuating ball nut in which major diameter of raceway is 3.062". Sixteen and three-quarter turns are milled at 18 IPM (rotation of workpiece), .0045" chip load, 328 rpm, and .100" depth of cut. The cutter turns clockwise and workpiece turns counter-clockwise.

The cutter for this job is 2.500" diameter with 12 teeth having .153"-.154" radius, 30° negative radial rake, and 0° axial rake.

Various grades first used in cutter gave only 2 or 3 pieces per grind. With the Grade K4H cutter 9 pieces are machined per grind.

REVOLUTIONARY! NEW!

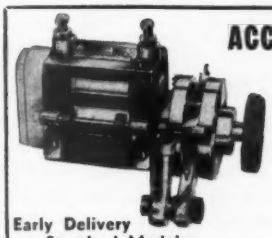
KRASBERG UNIVERSAL AUTOMATIC STOP... *can be used on any die!*

INSTALLED IN MINUTES!
SIMPLY MOUNT TO FRONT OF STRIPPER WITH TWO SCREWS — THEN DRILL HOLE FOR ARM AT GAGING POSITION.

Also Mfgrs. of Quality Tools, Dies, and Metal Stampings. WRITE TO:

R. KRASBERG & SONS MFG. CO.
2501 W. HOMER ST. — CHICAGO 47, ILLINOIS

CIRCLE INFORM-A-GRAM KEY NO. 179A



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Models to fit:
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FOR ANY JOB
FOR STOCK UP TO 12" WIDE

Early Delivery on Standard Models

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An Electric Affiliate

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NOTHING COMPARES FOR FAST ACCURATE LAYOUT AND INSPECTION.

A precision built height gauge with direct capacities from zero at base to 3" in thousandths. It scribes, it measures distances between holes or surfaces, it makes fast and accurate inspection possible. Finished in durable satin chrome. Can be supplied with our new 3" hardened, ground and lapped standard riser which extends the range to 6". *Write for circular and prices.*

FAIRFIELD GAUGE COMPANY

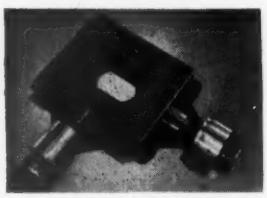
174 HERBERT STREET • BRIDGEPORT 6, CONN.

CIRCLE INFORM-A-GRAM KEY NO. 179C

NEW Bausch & Lomb BENCH COMPARATOR For Only $765!

NOW! LOW COST, FAST OPTICAL INSPECTION!

Here's how you save *every way* with this new Bausch & Lomb Bench Comparator. Save inspection costs—expensive holding fixtures no longer needed for most work. Save inspection time—no complicated set-up. Simply lay most kinds of work on table . . . see accurately magnified silhouette at eye level on 10" screen—biggest screen, with biggest field, in this low price range. Makes accurate inspection so easy that a new operator can quickly keep pace with capacity production. Often reduces many complicated measurements into one easy, fast visual check. Save by nipping costly production errors in the bud. And of course you save on purchase price—a workable unit for only $765. Put this new, dependable B&L Bench Comparator to work on *your* production.



Make fast, accurate measurements with the easily attached micrometer stage. (Optional at small extra cost.) Reads to 0.0001".

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BAUSCH & LOMB SINCE B&L 1853

Quality Control INSTRUMENTS

CIRCLE INFORM-A-GRAM KEY NO. 180

. . . Broach Handling, from page 177

ling pullers. The sliding broach handling support shuttles to starting position and stops automatically, ready to begin another cycle, while the finished part is being unloaded and a new part is loaded.

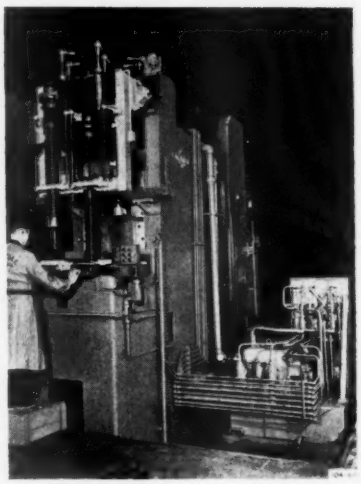

Fig. 3. Second pass in cutting position as automatic cycle nears completion. When cut is completed, work table recedes, broach is returned to its handling puller and completed part is unloaded while broach handling support shuttles to starting position to complete the automatic two-pass broaching cycle.

Entire system is electrically controlled and has hydraulic interlocks to insure positive positioning of all components in the machine cycle. Circuit is also arranged for jog cycle to set up or try out the machine. Handling pullers are equipped with limit switches, requiring full engagement of the broach and the handling puller before the shuttling fixture controls are energized to permit sideways movements of the broach handling supports and approach of the work table to cutting position.

High Production Hobber Demonstrates Operating Flexibility

A high production machine with the added advantage of quick changeover to handle a variety of parts, provides a plus value for the manufacturer. At Pratt & Whitney Aircraft, Division of United Aircraft Corporation, East Hartford, Conn., moderate length runs of aircraft

. . . Continued on page 188

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American's DRILL JIG BUSHING and the Amazing WESTINGHOUSE ROBOT "ELEKTRO"

American has established a new standard for service, reliability and quality for drill jig bushings. Their KING SIZE selection of A.S.A. and American Standard types of sizes, and the original 3-D simplified method of ordering from exclusive distributors everywhere, are OUT OF THIS WORLD!

Look for us at the A.S.T.E. Industrial Exposition and see the amazing Westinghouse Robot "ELEKTRO" in American's Booth.

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EXHIBIT BOOTH #1234
We invite you to come in and see the amazing Robot Show in our auditorium at the A.S.T.E. Industrial Exposition, Philadelphia, April 26-30, 1954.

AMERICAN DRILL BUSHING CO.
5107 PACIFIC BLVD.—LOS ANGELES 58, CALIF.
FEATURING THE ORIGINAL SIMPLIFIED METHOD OF ORDERING

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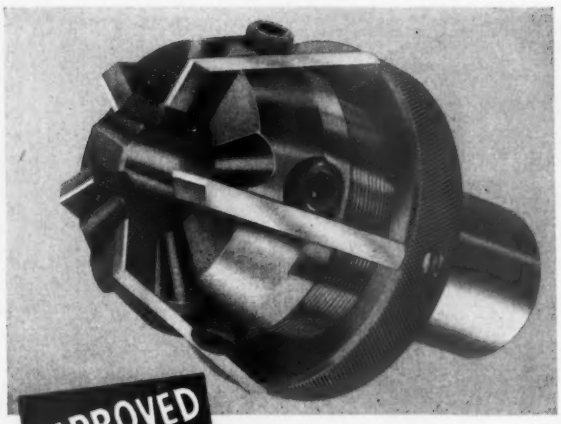

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GENESEE
Adjustable Hollow Mill

There is a size and style Genesee for every hollow milling job. Standard sizes from 0 to 2″, standard with straight or Morse Taper shanks carried in stock.

- Quick — easy adjustment
- Simple sharpening method
- High speed steel—cast-alloy —Carbide tipped blades
- Let our Engineering Department solve your Production tool problems

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Adjustable Hollow Mills • Facing and Counterboring Tools • Special Production Tools

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TOTALING
16,984 SIZES

Reduces "Specials"... Speeds Delivery... Cuts Costs

Only Acme offers *two* bushing standards giving you 9,870 EXTRA thin wall sizes...sizes now costing you premium prices elsewhere and delaying your production. SAVE *time* and *money*. Write for FREE catalog now.

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MAKERS OF HARDENED AND GROUND PRECISION PARTS

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World's Hardest Metal
TOOLS
BLADES
ROLLS
BAR STOCK
DIES
Many times more durable than steel, Talide Metal adds years of life to the wearing edges of tools, dies, machinery and equipment.
Hard as a diamond and almost indestructible, it triples output per man and per machine.
For good service and recommendations for improving any cutting, drawing or wear-resistant application, send particulars to Metal Carbides Corp., Youngstown 7, Ohio. Write for Catalog No. 54-G
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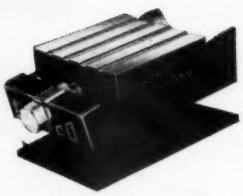
YOUNGSTOWN 7, OHIO
SINTERED CARBIDES · HOT PRESSED CARBIDES
HEAVY METAL · CERMETS · HIGH TEMPERATURE ALLOYS
OVER 25 YEARS' EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY

CIRCLE INFORM-A-GRAM KEY NO. 182C

Improved Empco JACKS are stronger!

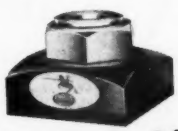
SAVE TIME SETTING UP AND LEVELING YOUR MACHINES WITH FAST, ACCURATE, SELF-ALIGNING LEVELERS!



Style JD Wedge type

You can meet hurry up demands for relocation of machinery quickly and easily with improved EMPCO JACKS. You just raise the machine enough to slip EMPCO JACKS under the base (the number depending on the size of the machine). Turn the adjusting screw up or down until the level indicator reads "zero," and the job's done.

To reduce vibration, VI-SORB mounting pads are available with each style EMPCO JACK. Write for specifications and prices today.



Style JS Screw type

EMPCO PRODUCTS

THE ENTERPRISE MACHINE PARTS CORPORATION
735 JEROME AVENUE • DETROIT 12, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 182D

. . . Carbide Cutters, from page 179

a five-horsepower motor installed.

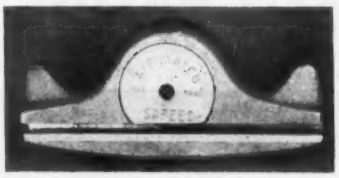
Cutter for this operation is of 2.500-inch diameter having twelve Kennametal K4H teeth of 0.153-0.154-inch radius, 3-degree negative radial rake, and 0-degree axial rake

Various grades of tungsten carbide first used in this cutter gave only two or three pieces per grind. Now, tipped with Kennametal, nine pieces are easily machined between grinds.

A 5-degree positive axial rake on alternate teeth was tried. Since this design change increased grinding costs without improving finish or cutter life, it was dropped in favor of the 0-degree axial rake. Accurate cutter regrinding is essential to maintain a present cutter life rate of nine pieces per grind.

Every Punch Press Operator Needs the "Safety" of a SAFEED Patented

PREVENTS INJURY — SAVES GLOVE COSTS



Feeds ferrous, non-ferrous strip or sheet . . . faster, safer. Use for stamping, shearing. Right or left hand non-slip fitted grip, self-adjusting. Sturdy, hardened work surfaces. FULLY GUARANTEED.

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Early delivery.

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CIRCLE INFORM-A-GRAM KEY NO. 183A

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For demonstration . . . Booth 1971 . . . A. S. T. E. Exposition

√ MILLING
√ PLANING
√ SHAPING
√ TAPPING
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√ DRILLING
√ ASSEMBLING

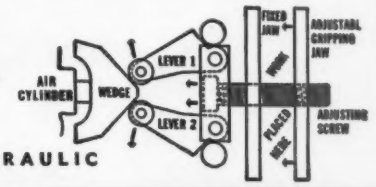
SAFE . . . POSITIVE . . . POWERFUL

AIR **AIRLOX** HYDRAULIC

TM REG. U. S. PAT. OFF.

AIRLOX pat'd wedge-&-lever action utilizes total cylinder drive. Positive rigid grip on the work. Especially suited to CARBIDE MILLING, and almost all milling operations. Five senior models . . . 50 to 200 tl. air line pressure. Write for data sheet.

PRODUCTION DEVICES INC., Whitehall, N. Y.



CIRCLE INFORM-A-GRAM KEY NO. 183B

PRECISION-FINISH YOUR OUTSIDE DIAMETERS

The Odee-HONE

★ ACCURATE
★ INEXPENSIVE
★ VERSATILE
★ LIGHTWEIGHT

Corrects out-of-roundness, waviness, chatter . . . Generates diametric size within .0001" tolerance . . . Hones all parts from ½" to 2½" in diameter—regardless of length or material . . .

Can be used on any lathe, drill press, electric drill . . .

Simple to set up and operate—no aligning, fixturing or wheel dressing is necessary . . .

Removes a few "tenths" or a few "thousandths" stock in less time than it takes to re-center, indicate a part, and dress an abrasive wheel.

Write to:

MICROMATIC HONE CORPORATION

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Guilford, Conn. • Rockford, Ill. • Los Angeles 23, Cal. • Brantford, Ont., Canada

CIRCLE INFORM-A-GRAM KEY NO. 183C

Commander

SELECT A SPINDLE

DUAL SPEED DRILL PRESS TURRET

DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

- **Fits Any Drill Press**
- **Increases Production**
- **Reduces machine, fixture costs**

Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2 or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to ¼" available.

SEE US AT BOOTH 823
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Commander MFG. CO.

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PRODUCT OF COMMANDER . . . BUILDER OF PRODUCTION TOOLS

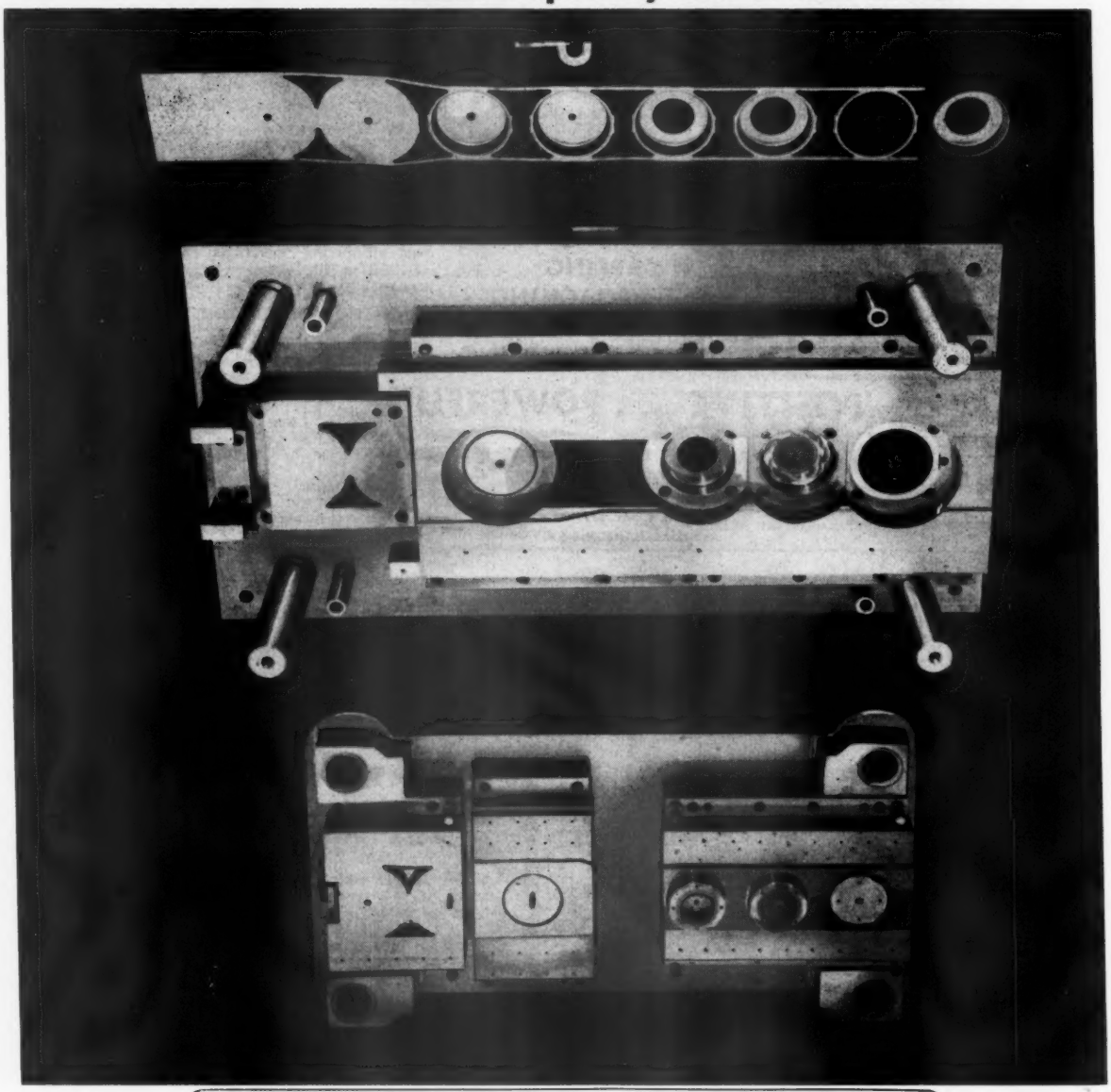
CIRCLE INFORM-A-GRAM KEY NO. 183D

DUST SHIELD.. ?

for Propeller-Shaft Bearing

BARTH PROGRESSIVE DIE.. !

makes it speedily and at low cost



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DIES • JIGS • FIXTURES • SPECIAL MACHINES • UNIT ASSEMBLIES • AUTOMATION • SERVO MECHANISMS • STAMPINGS

CIRCLE INFORM-A-GRAM KEY NO. 184

Diamond-Studded Nylon Belts Polish Carbide Dies

Commercial diamonds, embedded in a belt of extruded Du Pont nylon plastic, are solving die polishing problems posed by the replacement of conventional steels by ultra-hard carbide in tube and rod drawing dies.

The diamond-studded belt was developed by the Hartford Special Machinery Co. for use in its die polishing machine. The belts are made in rounds, half-rounds and irregular shapes.

Nylon material is used because diamonds cannot be adhered satisfactorily to conventional fabric polishing belts. The cushioning effect provided by the nylon keeps the diamond grits from tearing out of their sockets. Further, the tough nylon resists wear so well that in tests as many as 460 dies have been polished with one belt. Finishes as fine as one-half micro-inch are being obtained, reports Hartford. Initially designed for removing wear rings in bell-mouthed dies, the diamond impregnated nylon belts have been used to polish inner ball bearing races and outside diameters of carbide rolls. In the latter instance, 20 minutes are required for belt polishing as opposed to four hours for the hand-lapping method it has replaced.

A major advantage to the use of extruded nylon for these belts also lies in the variety of shapes possible. While the nylon is extruded in flat or round sections, it can be machined to any desired profile. The belts can be washed in warm, soapy water with no effect on the bond. Because of nylon's resistance to corrosion, almost any type of coolant can be used during polishing operations.

Hartford is also experimenting with the diamond nylon belt in polishing carbide turning tools and have found that tool life is considerbly increased. The company feels that any finishing of a hard material requiring a very low micro-inch surface is a natural market for the belt. The use of the belts for polishing glass is also contemplated.

The die polishing machine, itself, is unique in that it uses an endless belt driven at grinding wheel speed. This method polishes substantially parallel with the line of draw of the work through the die. The machine is completely motorized and can accommodate almost any style of die, such as used in drawing rods, bars and tubing, as well as deep drawing dies. The above illustration shows a die held in the Universal chuck with the diamond-studded abrasive belt in place for polishing.

INDIVIDUAL VULCANAIRE

DUST COLLECTING UNITS

They are used on surface and other grinders where grinding dust must be removed.

Inexpensive, compact units, with no moving parts. Operated from your present air supply.

Installed in a few minutes, eliminating need for costly centrally located dust collecting systems.

The collector element is mounted on the side of the machine. Quickly cleaned, requiring no refills.

Vac-suction pick-up device (vacuum nozzle) is mounted on the grinding wheel guard or close to grinding wheel on other applications. This mounting permits constant contact with dust as the wheel is moved up or down.

A simple needle valve operates the unit, and can be shut off whenever the machine is not in use.

Available in 700 series for grinding wheels 7" dia. or less.

Made by the makers of Vulcanaire The jig grinding attachment.

WRITE on your letterhead for "Dust Collector" Booklet.

VULCAN TOOL CO.

PRITZ STREET • DAYTON 10, OHIO

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SHOP DETECTIVE at work!

SEE what the PROFILOMETER can disclose about *your* production operations — SEE how it measures surface roughness, on parts that *you* select — and FIND OUT how helpful that can be, in unexpected ways. ***A demonstration will tell you, IN YOUR PLANT*** — with no obligation on your part.

FREE BULLETIN LT90 describes our demonstration service — tells what we do, how long it takes, and why you'll find it interesting. WRITE TODAY for your copy!

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345 S. MAIN ST. ANN ARBOR 14, MICH.

CIRCLE INFORM-A-GRAM KEY NO. 186A

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DIAMETRICK CALIPER-GAGE

"A new Trick for checking I.D.'s"

- Wide Range
- Multi-purpose
- Trouble-free
- Ideal for "O" Ring Grooves
- Greatly Minimizes I.D. Gage Investment

A precision measuring instrument invaluable for speed, accuracy, efficiency and economy. Write Dept. T—address below, for complete information and prices.

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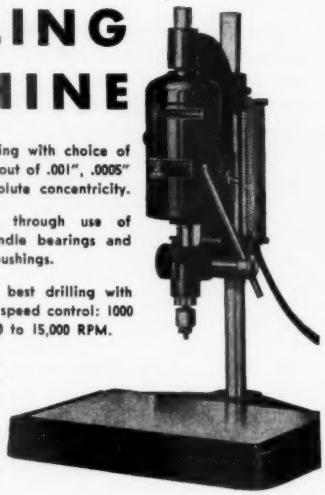
CIRCLE INFORM-A-GRAM KEY NO. 186C

8" PRECISION DRILLING MACHINE



- Super accurate chucking with choice of three types giving runout of .001", .0005" or adjustable to absolute concentricity.
- Minimum side play through use of smaller precision spindle bearings and widely spaced quill bushings.
- The exact speed for best drilling with continuously variable speed control: 1000 to 10,000 RPM or 2500 to 15,000 RPM.
- Special slow quill feed on dual feed models for drilling below No. 60.
- Minimum vibration-direct motor drive—no belts.

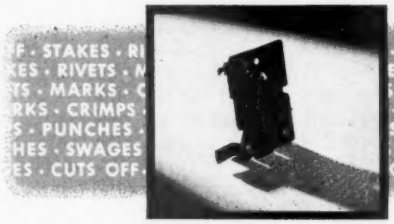
Write for Literature

The Electro Mechano Co.

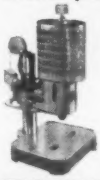
260 E. Erie St. Milwaukee 2, Wis.

CIRCLE INFORM-A-GRAM KEY NO. 186B

ELECTROSTAKE CUTS COSTS at Eastman Kodak



The Eastman Kodak Company uses ELECTROSTAKE — the automatic solenoid-operated staking machine — to stake shutter parts for Brownie Hawkeye cameras. ELECTROSTAKE presses the assemblies together — then *automatically* delivers the staking blow. Better control of the impact cuts scrap . . . and because ELECTROSTAKE is faster and simpler to use, operators are able to stake far more shutter parts than they could on foot-powered machines.



Delivers impacts up to 3500 lbs. — hold-down pressure can be pre-set from 0 to 20 lbs. Economical to buy, operate and maintain. Plugs into any 115 V., A.C. outlet.

Write — or phone Bl gelow 4-6370 — for folder showing complete line of Black & Webster electric production tools.

BLACK & WEBSTER, INC.

Dept. 2, 445 Watertown Street, Newton 58, Mass.
Solenoid-operated Production Tools

CIRCLE INFORM-A-GRAM KEY NO. 186D

. . . Transfer, from page 59

switches will be closed, thereby energizing relay R1. This will close contact R1 energizing SV, the coil of a solenoid. The solenoid will operate a hydraulic cylinder similar to that shown in the hydraulic schematic (Fig. 5), withdrawing the location pins and unclamping the workpiece.

In the actual interlock circuit, additional contacts are included to assure the proper position of the various other components of the machine before this operation can take place. Similar method is used for the interlocking of the "Clamps forward" and "Clamps back" limit switches.

The three pushbutton switches shown in series are emergency retract buttons which, when depressed, will de-energize the circuit and, through other contacts of R1, stop the operation of the machine. ▲ ▲ ▲

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GEAR HOBBING MACHINES
THESE MACHINES ARE UNEXCELLED FOR SIMPLICITY OF OPERATION, PRECISION AND UNIVERSAL APPLICATION
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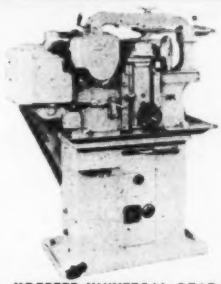
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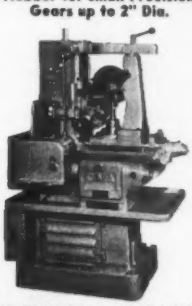
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NEW #3 - UP TO 10" DIA.
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We offer gear cutting equipment for the Watch and Tool Industry, Hobbing Machines for Small Gears, Gear Testers and Tools.
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COMPLETE LINE OF PRECISION INSTRUMENTS
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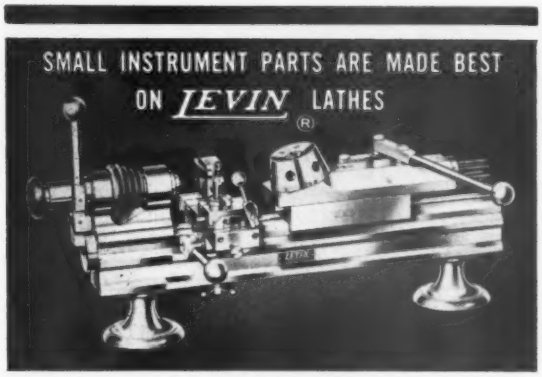
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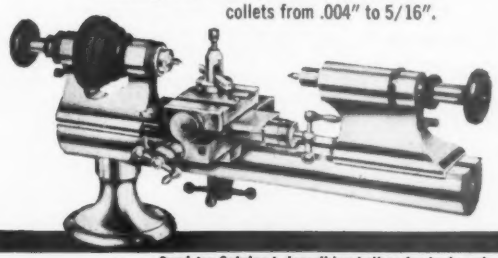
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CIRCLE INFORM-A-GRAM KEY NO. 187B

SOLVE YOUR HOLE ACCURACY PROBLEM with Horberg PRECISION PIN GAGES

EXCLUSIVE CONCENTRIC ENTRY TAPER for faster, more definite inspection of holes, for greater ease in centering. Gage sets supplied for all common drill sizes.
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SETS: Two gages in each size, with convenient stand.
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Affiliate of Norberg Grinding Industries, Inc.
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. . . Hobber, from page 180

spur gears are produced on an Ultra-Speed hobber. Tooling on this installation permits Pratt & Whitney Aircraft to take advantage of the machine's high operating rate and still enables it to be used efficiently for moderate volume hobbing.

Actual production rate is classified but it doesn't take too long to handle some of the runs on aircraft gears. A variety of spur

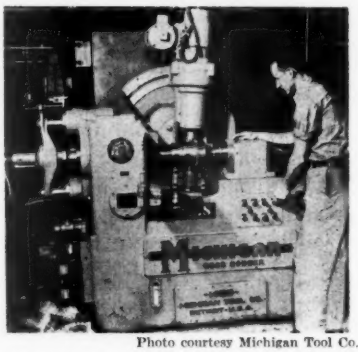

Photo courtesy Michigan Tool Co.

Hobbing rear timing gear teeth for Pratt & Whitney Aircraft Wasp Major machine. Two AMS 6260 steel forgings are hobbed at one time (2 blanks back to back) in the Ultra-Speed hobber. Machine's versatility and high production rate makes it specially suitable for moderate volume production, as well as high volume jobs for which usually used.

gears within the Ultra-Speed's work range can be hobbed but, to attain maximum efficiency, changeover time must be held to a minute.

To make a change from one spur gear to another of different diametral pitch and number of teeth, all that is required is the removal of the hob and the replacing of the proper ratio gears, and the removal and replacing of the hob speed gears, if necessary. The fixtures are then taken off and replaced with the next set. All that this requires is the removal and replacing of four (4) bolts, each on the headstock and tailstock. Spacers on the yoke ends are changed if it is necessary to change the relation of the gear to the hob. All that remains is to adjust the infeed, set the crossfeed limit switches, check depth of cut.

Changeover time is approximately forty-five (45) minutes. This could be reduced slightly on small parts by mounting the parts on an arbor. If the arbors are properly designed, all that is necessary is the changing of the hob, the ratio gears and possibly the hob speed gears.

No. 2 INDICATOR (2¼" DIAMETER)
No. 1 INDICATOR (1¾" DIAMETER)
MIDGET (1⅛" DIAMETER)
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ANOTHER STEP FORWARD
DOUBLE-SPINDLE MODELS

-2S (Two Spindles) Plier Models

-2S (Two Spindles) "C" Clamp Models

With this new double-spindle arrangement you can now clamp your work anywhere within the throat gap.

Available in 4 series—Models for 1-1/8 — 2-7/8 3-7/8 and 5-7/8 maximum throat gap.
All models have 2-1/4 throat depth and a clamping force of 1200 pounds.

Above illustrations show 3-7/8 inch throat gap models.

Along with the above, we also offer Pliers and "C" Clamps of other throat gap and depth and a full line of Toggle Clamps for fixed mounting, both manual and air-operated.

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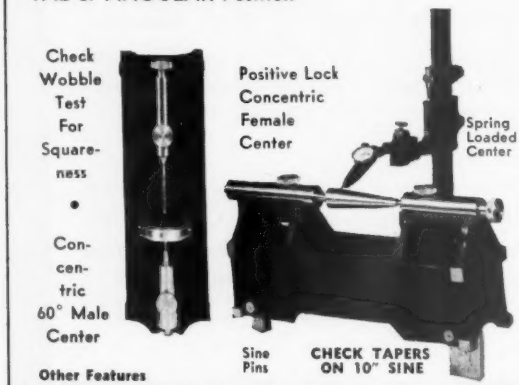
CIRCLE INFORM-A-GRAM KEY NO. 190A

NEW "Surfcenters"

The Super-Precision Universal Test Center That Can Be Set On Surface Plate In VERTICAL, HORIZONTAL or ANGULAR Position



Other Features

1. Weight 21 lbs., Length 12"
2. Swings 5" Diameter
3. "V"s held to accuracy of .0002" for parallelism & squareness
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5. Ribbed Hi-Alloy Semi-Steel Base seasoned & deep frozen set
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7. Complete with set of 3 centers & Mahogany case

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NEW DIAL SINK

1. Checks end diameters of counter sinks with dial Indicator.
2. Four ranges available: ½", 1", 2", 3". Checks counter sinks 0°—120°
3. Special gages to check male chamfers. Quotation upon request.

PRICE $85.00 One Inch Range

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CIRCLE INFORM-A-GRAM KEY NO. 190C

NEW ADJUSTABLE DRILL JIG
eliminates layout; cuts drilling time

Used for drilling holes through round stock and hex stock from ¼" to 2" and cap screws from ¼" to 1¼", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typical of the operation that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for ¼" to 21/32" diameter, one for 21/32" to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. Jig highly successful in permitting use of inexperienced drill operators. For circular write to: **Mathewson Machine Works**, 38 Hancock St., Quincy, Mass.

CIRCLE INFORM-A-GRAM KEY NO. 190B

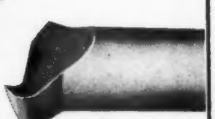
✓✓✓ Check these 3 Comet 'TIPS' for Precision Boring, Facing and Internal Threading

MADE OF HIGH SPEED or CARBIDE
FOR HOLES FROM 1/16" UPWARD
17 DIFFERENT SIZES

✓ BORING TOOL

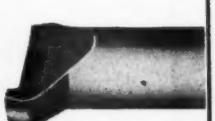
- FAST PERFORMANCE
- ECONOMY IN PRODUCTION
- EFFICIENT IN RESULTS

Cutting Edges are lapped for better "Bores" and faster Feeds.



✓ FACING TOOL

- CONSTANT CLEARANCE
- CONSTANT SHAPE OF CROSS SECTION
- EASY RESHARPENING
- CONVENIENT TO USE
- LONG LIFE



✓ INTERNAL THREADING TOOL

- CONSTANT SHAPE AND CLEARANCE
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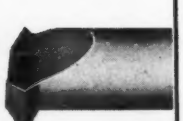
- CONVENIENT TO USE - LONG LIFE



Dealers! Here's a Profit-Maker!

Write For Complete Data

COMET Tool Co. 738-T Broadway New York 3, New York

CIRCLE INFORM-A-GRAM KEY NO. 190D

. . . Vapors, from page 63

It has been most interesting to note that agitation improves the operation of the oils made with Quenzine much more than with straight mineral oil. Of course, the reason is that with Quenzine treated oil the heat is extracted more rapidly from the work. The agitation spreads the heat throughout the quench bath thereby promoting a continuation of the faster heat transfer at the contact points.

It is true that on many critical jobs the best way to eliminate completely all distortion and cracking is by raising the temperature of the quenching oil bath. This permits the temperatures of the surface and the center of the work piece to more nearly come in balance before entering into the martensite range. Figure 3.

Here again a faster quenching oil than just a straight mineral oil will bring about much better results, because the faster quenching oil makes it possible to operate the baths at a little lower temperature. This also gives longer life to the oil, more uniform hardening and better hardness to the thicker section.

More thought to the type of oil used is encouraged to bring about improvements in results — including uniform hardness, deeper hardness, less internal strains, distortion and cracking.

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You save time . . . assure better work with these portable magnetic base units. They're LIGHTING LIFESAVERS in the shop on all machines, for layout and inspection, close assembly operations, maintenance and repair.

Model No. 600 Inspection Light Complete with 6 foot cord & 25 watt bulb.

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√Powerful 50 lb. pull permanent magnetic bases!
√Attach instantly to any ferrous surface, curved or flat!
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Magna-Holders are produced by the Country's largest exclusive manufacturer of magnetic base instruments and custom accessories including MAGNA-HOLDERS for flood lights, inspection lights, flash lights, safety shields and magnifying glasses. If your dealer cannot supply—order direct. Write Dept. 24-D.

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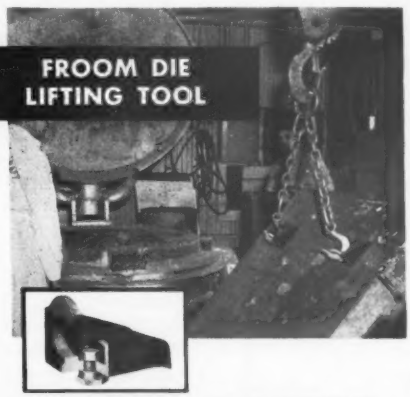
CIRCLE INFORM-A-GRAM KEY NO. 191A

FROOM DIE LIFTING TOOL



HANDLE HEAVY FORMING DIES SAFER-FASTER

With A Tool Designed For The Job

Here's a tool that hoists heavy forming dies to melting pots quickly, safely, dependably—without danger to employees or possibility of damage to costly equipment. No eye-bolts to fail under stress and strain . . . no danger of "shifting" after die-lifting tool is properly positioned. "Holding power" actually *increases* as lifting force is applied!

Now in daily use in forges and foundries the country over, Froom Die Lifting Tools are simplifying a tough job safely. Write for complete details.

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NEW! RAMPE TWIN
PRECISION BARREL FINISHER

"THE MOST MACHINE FOR THE LEAST MONEY"

With Tilting Chutes

This sturdily built Barrel Finisher will handle steel burnishing balls in both barrels—is amply powered by a ¾ H.P. 220/440 volt 3-phase motor for standard 10¾" x 17" barrels or larger barrels, if desired.

The moveable chutes tilt to the rear for draining—to the front for delivering load to containers. When tilted to the rear chutes act as safety guards for revolving barrels.

Safety covers for barrels prevent pressure build-up—perforated drain door also furnished. Starting button is waterproof. Has ball bearing variable speed drive. Lined barrels are coated with vinyl plastic.

WITH UNLINED BARRELS $605.00

WITH LINED BARRELS $685.00

F.O.B. Factory Cleveland, Ohio

Write for literature and complete information.

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CIRCLE INFORM-A-GRAM KEY NO. 191C

10 cutting edges on one KENDEX* tool!

No tool grinding expense and *minimum* machine down time for tool changing—these are the advantages you obtain from multiple-edge Kendex "throw-away" insert tools. For example:

A Kendex round insert, used to bore 2½" cast iron stators, machined 300 pieces before one cutting edge dulled. Then, without removing the shank from the boring bar, the "button" was revolved to a new cutting position, until 3,000 stators were machined with the insert's 10 cutting edges. Best previous performance, by a conventional brazed tool, was 400 stators per tool grind.

Kendex precision-ground buttons have Kennametal's high wear-resistance, for long life. Screw-mounted, they can be rotated in seconds to new cutting positions without removing or resetting the tool holder . . . a great time-saving feature. When all cutting edges are used, the insert is thrown away—replacement cost is slight compared to that of regrinding.

Only Kennametal makes Kendex "throw-away" inserts. Ask your nearest Kennametal tool representative to help you apply this cost-saving tooling to suitable operations in your plant. Kennametal Inc., Latrobe, Pa.

*Registered Trade-Marks

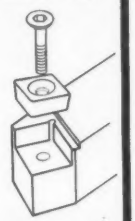
How KENDEX* Works

1

Hard, strong, wear-resistant Kennametal is molded into square, round, or triangular Kendex inserts, which are precision ground.

2

Kendex inserts are mounted to suitable tool holders with socket head screws.

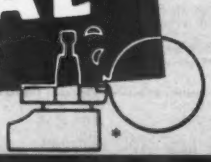


3

When edge becomes dull, insert is turned to new cutting position. When all cutting edges have been used, insert is thrown away; no regrinding.

KENNAMETAL*

CEMENTED CARBIDE TOOLING THAT INCREASES PRODUCTIVITY



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A-8

Underpass Shaver

Production shaving of a two-gear cluster for farm tractor transmissions poses a machine requirement of high production and flexibility. The same shaver is used to finish both gears in the cluster and it must be capable of performing the shaving operation to the required accuracy with a minimum time loss for changeover.

To attain a production rate of about 240 gears per hour a Model 870 underpass gear finisher built by a leading tool company of Detroit, is automation equipped. The only operator attention required is putting parts into the loader.

Photos courtesy Michigan Tool Co.

Fig. 1. Operator shown using sizing fixture at top of loader. Gear is automatically sized without delay. Second sizing fixture is visible on housing to left of operator.

Since one of the gears in the cluster has 23 teeth with a 14 normal pitch and a 1.6429" pitch diameter and the second has 28 teeth with a 14 normal pitch and a 2" pitch diameter the machine set up is changed for each shaving operation. Only three steps are required in the changeover and are accomplished in a few minutes: (1) Center distance is changed by means of a handwheel; (2) sizing fixture is changed by removing four bolts; and (3) the sub-plate, mounting the head and tailstocks and the loader, is positioned by lining up locating markers (visible at front of machine).

A cylinder pushes the gear to be shaved into a round carrier with a diameter equal to that of the larger gear. When a limit switch is tripped on retraction of

. . . *Continued on page 197*

KEEP FLYING CHIPS WHERE THEY BELONG

by using DILLEY Magnetic Grip-Shields

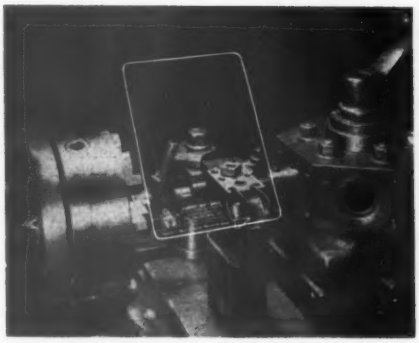
All sizes of DILLEY Plastic Shields fit the magnetic base. One lock-nut permits quick and easy change to any size shield desired.

No flying chips can reach these eyes! The Grip-Shield allows close inspection and clear vision without danger at all times.

Permanent Alnico Magnet allows attachment to any part of machine. Note how the Grip-Shield rides with cutting tool, effectively blocking flying chips and guiding them to one side where they belong.

Two-way positioning arm allows adjustment of Grip-Shield to any angle desired. Can be adjusted for any type of chip-cutting job.

DILLEY Magnetic Grip-Shields are practical, economical, safe and easy to use, and never get in the way. Tried and proved in industry by tool engineers, by safety engineers, by management and by workers.



Sizes	Each for 1 — 11	Each for 12 — 23	Each for 24 or more
6"x8"	$8.20*	$8.05*	$7.80*
8"x10"	9.25	9.10	8.85
10"x12"	10.10	9.85	9.60
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A-8 SALES OFFICES IN PRINCIPAL CITIES

. . . Evolution, from page 53

lustrated in Figure 10. This development is largely a result of the aircraft manufacturer's need for (1) changing cross sectional angularity in parts; (2) long shallow contours and (3) close cross section tolerances in extruded parts.

Experience with the fixed right-angle wipe-shoe has shown that while it is ideal in the forming of 360° rings, the location of the point of operation of the shoe on the forming part as it wraps around the die is critical. Even with the fixed right angle shoe assembly, minor lateral adjustments of the shoe are made possible.

So, for the forming of long shallow parts and parts requiring acute angle bends, the Traversing Wipe Shoe has been introduced. The right angle compression cylinder, with its wipe shoe attachment, is provided with a frame guideway set parallel to the main line of the machine and equipped with a motor so that it can be adjusted to operate in any required position.

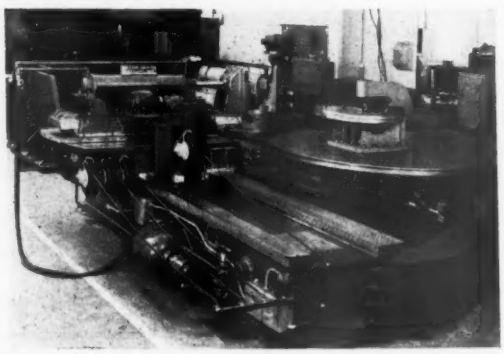

Fig. 10. The Precision Stretch Former showing the traveling wipe shoe.

It can be fixed to operate at any point of tangency as the die rotates, or may be used as a traversing wipe shoe proves its worth by ironing almost as a woman irons a shirt sleeve. Its purpose, and its achievement, is to give an exceptionally high degree of precision stretch forming. Hence its name. Certainly, its ability to form long shallow parts, and parts with changing cross sectional angles, is reason enough to justify its inclusion in the airframe manufacturer's list of essential tools. Here again, the traversing wipe shoe proves its worth by ironing the part being formed onto any angular variation of the die face. An example of this was a T section, Figure 11, of an airframe tail structure in 75 S. O. aluminum which was successfully formed in one operation on a Bath machine, whereas prior to this,

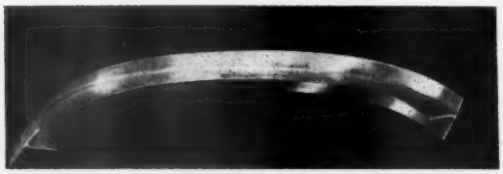

Fig. 11. An example of a T section of an airframe tail structure which was formed in one operation on a Bath machine.

the use of the conventional stretch machine had to be followed by nearly 20 hours of handworking to form each part.

Another purpose of the Precision Stretch Former is to reduce the procedure for the forming of modern hard alloys to one operation only. It has hitherto been the practice to give the material an initial stretch in the softer O condition, to heat treat it, and then complete the forming with a final stretch in the required T condition.

In many cases, using the machine equipped with the traversing wipe shoe, parts have been formed in the T condition to required tolerances in one operation only.

Sheet Forming

The bigger machines in the Radial Draw Former class are all capable of forming large sheets to any required contour up to 360°. This is a feature which can lead to the elimination of much of the stitching and hand work at present necessary in aircraft plants.

To ensure the rigidity of the die on the table. a clamp is installed and then the forming procedure follows the normal routine. Figure 12 is an example of a sheet forming operation on a 25 ton machine.

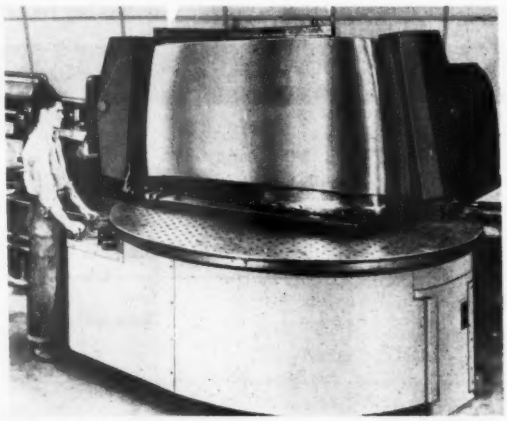

Fig. 12 is an example of a sheet forming operation in a 25 ton machine.

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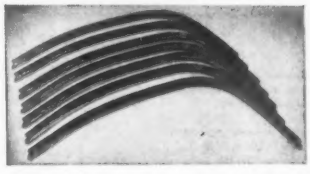
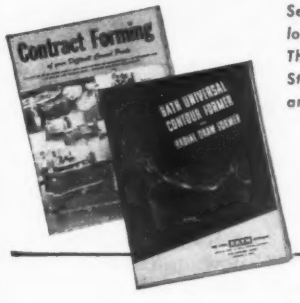


In designing air frame members and jet rings for stretch form production you get:

1. ***ACCURATE PARTS*** in hard to work alloys at a fraction of the time and cost involved in machining castings or forgings.
2. ***COMPOUND SHAPES*** and angular changes impossible to produce by any other method.
3. ***ONE PIECE SECTIONS*** instead of two or three parts welded and dressed down.
4. ***OPERATOR SAFETY*** with a 12 year record.
5. ***TRUE RINGS*** held to machining tolerances.
6. ***A SAVING*** of more weight and critical material per 1000 pounds of engine thrust than by any other forming method.



Send for one or both of these FREE catalogs without obligation on your part. They contain a wealth of information on Stretch Forming, Compression Forming and Radial Draw Forming.

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NEW METHOD FOR LAPPING SHOULDER FACES OF SHAFTS

A new method for lapping shoulder faces of shafts consists of providing the lap plate with a series of annular grooves to accommodate the stem of the workpiece and allowing the shoulders to "ride" the top of the lap plate during the cycle. The fuel pump parts are pre-loaded into a special brass cylindrical work holder which has been bored out slightly over-size to the diameter of the workpiece. These special work holders provide the necessary weight and needed balancing properties.

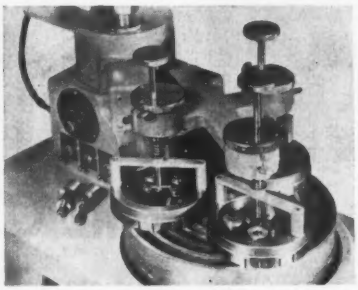
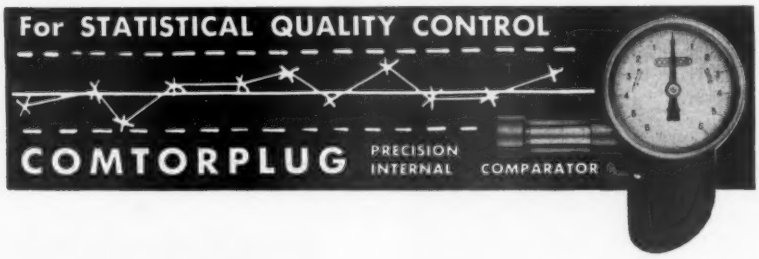


Photo courtesy of Crane Packing Co.

The adjustable roller guides located at the base of the conditioning ring guide stems are so located to the perimeter of the work holder that the parts being lapped will be held in proper position. Ball bearing races in the guides reduce friction to a minimum and the work is free to rotate in its own orbit on the lap plate.

In order to overcome the amount of wear caused by the work on the lap plate the conditioning rings are spring loaded. This provides a greater downward force of the conditioning rings on the lap plate. Amount of spring tension is controlled by the set screw as shown in the foreground of the conditioning ring assembly at the left in the illustration. An indexing measure is provided on the spider bar arm cap. A proper setting of the conditioning ring on the lap plate can thereby be obtained at any time. Shoulder lapping, a slow process, has been simplified and production greatly increased with this method.



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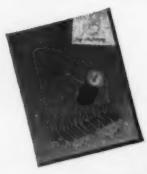

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DIE CUSHION WORKING MODEL

Scale models of die cushions that show the fundamental functions as to the use, design and construction, as used on the general power press are now available from the Dayton Rogers Mfg. Co., Minneapolis 7, Minn.

Mounted on thick plywood, these demonstration models are primarily produced for trade schools and engineering colleges.

NEW MACHINING EQUIPMENT

Kropp Engineered Products, a subsidiary of Kropp Forge Company, is installing $1-1/2 million worth of new machinery and equipment which will enable the company to perform all types of machining of both ferrous and non-ferrous metals, it was announced by Roy A. Kropp, president.

. . . Underpass Shaver, from page 192

the cylinder, a second cylinder at the back of the machine pulls the gear into shaving position. An arbor moves into position and holds the gear for the shaving operation. Movement of the arbor into position causes a limit switch to be tripped, starting the underpass shaving cycle.

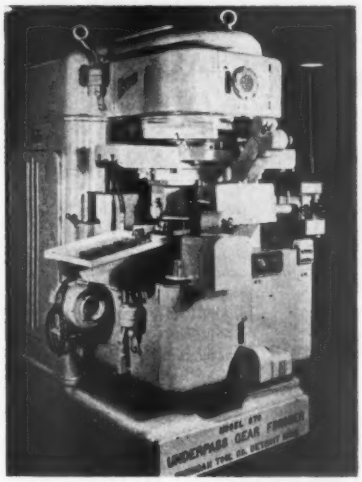


Fig. 2. Side view of underpass shaver. At right of machine are the two cylinders, one is used to bring the gear into position for shaving, the other brings the arbor into the gear.

When the cutter stops at the end of the shaving cycle another limit switch is tripped causing the arbor to retract and the gear carrier to return to loading position. The next gear being moved into shaving position pushes the finished gear onto a chain conveyor which carries it to a stock tray or to another conveyor, as desired.

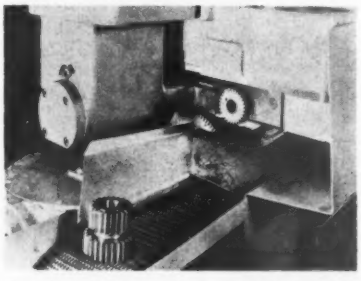
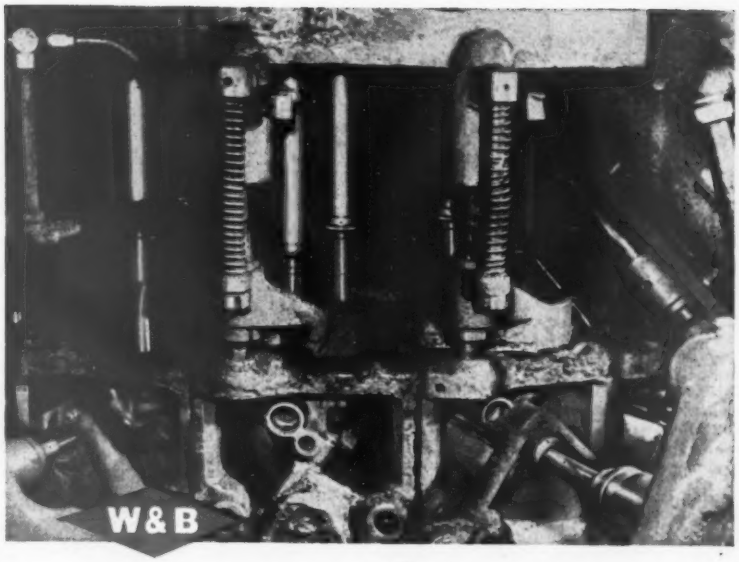


Fig. 3. Closeup of gear being brought into position for shaving. In left foreground is the conveyor used to take finished gear away from machine.

During the shaving operation, 0.005-inch of stock (measured over two pins) is removed. The 23-tooth gear is shaved at a rate of 240 per hour with output of the 28 tooth gear being slightly lower.



Carbide Drills Selected For Long-Life and Increased Production

Illustrated above is a fifteen station vertical automatic indexing machine using sixteen Whitman & Barnes carbide drills ranging from ¼" to 9/16" diameter, two carbide core drills and one carbide reamer. Simultaneous vertical, horizontal and angular drilling of oil pump bodies is done on this machine.

This large manufacturer of automobiles selected W & B carbide drills as a means for increasing production of these cast iron oil pump bodies. Because W & B carbide drills have extra-long-life and provide more holes per grind, his drilling cost is reduced, there are fewer shut-downs for changing drills and maximum production time is obtained from each machine.

More and more industries are discovering that W & B carbide drills are the cost cutting answer to tough drilling problems and operating efficiency. Why don't you investigate the unusual potentials of these high quality drills and see how they will increase production, reduce machine down-time and keep drilling costs to a minimum on your jobs.

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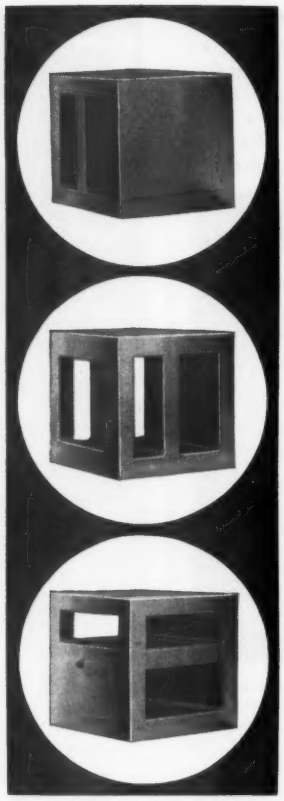

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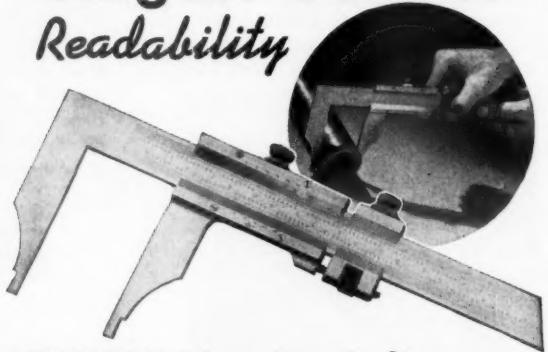

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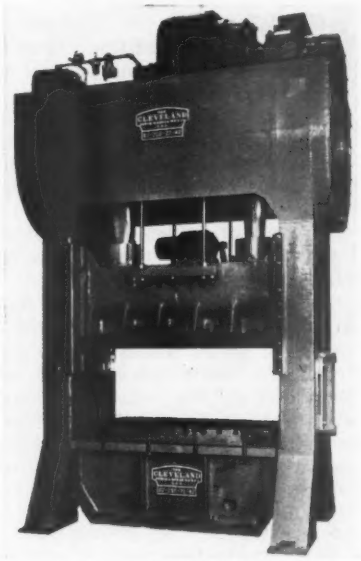


Photo courtesy The Cleveland Punch & Shear Works Co.

The accompanying illustration shows the CLEVELAND "S2-250" straight sided, double crank press. It is double geared, twin drive, and is equipped with the drum type air friction clutch and arranged with air counterbalance to the slide. The press is equipped with pneumatic cushion in the bed, and the flywheel has an auxiliary air brake to bring it to a quick stop when the power is shut off.

Carbide Institute

The University of Pennsylvania's Mechanical Engineering Department will conduct the nation's first "all-industry" Carbide Institute during "Tooling for Production Week" in Philadelphia, April 26th to 30. The Institute will be co-incident with the 1954 Industrial Exposition.

The University staff is being assisted in the Institute by the technical counsel of members of the National Education Committee of the ASTE as well as by the nation's leading carbide manufacturers and manufacturers of tool room and production machinery and equipment.

Each morning session will be devoted to a presentation by one of three leading carbide manufacturers participating. General Chairmen for the Institute are Dean Gulick of the University of Pennsylvania, assisted by A. R. Diamond, Vice President, Tools, Inc., Philadelphia, who is also chairman of the ASTE National Education Committee. The Institute committee is headed by Edmund A. Hollingsworth, President of Tools, Inc., assisted by: Robert Mason, Carboloy Department, General Electric Company; Douglas Cunningham, Kennametal, Inc.; Robert C. Wilkinson, Firth Sterling, Inc.; Prof. Jan. N. Edmondson, Ohio State University; Prof. O. D. Lascoe, Purdue University; Prof. Robert McKee, University of Michigan; Prof. M. L. Begeman, University of Texas; Prof. Fred. Preator, Utah State College; Robert E. Wolfe, Illinois Tool Works.

HEAVY DUTY 6″ CARBIDE TOOL GRINDER

A new 6″heavy-duty carbide tool grinder has recently been developed by a Cincinnati tool company. It is available in either the bench model, shown in the illustration or mounted on a floor pedestal.

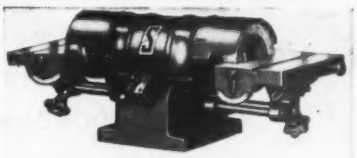
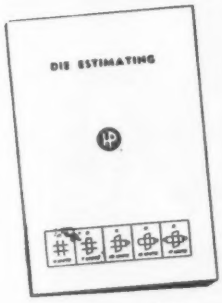


Photo courtesy The Standard Electrical Tool Co.

The ¾ hp, 3600 rpm motor is available for either single-phase or three-phase current. The equipment includes forward-off-reverse control switch and steel wheel guards which are adjustable for wear. The heavy work tables on each side, measuring 10″ x 7″, are adjustable 10 degrees above to 20 degrees below horizontal axis. This machine is suitable for either grinding wheels or diamond wheels.



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1954 Industrial Exposition Has

Late this month, the ASTE holds its long-awaited Industrial Exposition at Philadelphia. Developed around the main theme of "tooling for competition", the many exhibits and technical meetings will attract many thousands of visitors.

In March, 1938, the ASTE held its first Industrial Exposition in Detroit, Michigan, with 162 exhibitors participating.

The initial event drew 23,755 registrants with some coming from "as far away as the New England States." Most however, registered from Detroit and Michigan.

The exhibition was considered a huge success coming as it did, when production activities in many industries were at a low ebb.

The Industrial Exposition this year, however, has close to 500 exhibitors from 21 states and 3 foreign countries. More than 50,000 registrants are expected at the show which will be held in Philadelphia's convention center April 26-30. Surely the exposition has come a long way since 1938.

The record-breaking number of exhibitors will occupy approximately 155,000 square feet.

Unprecedented interest in "tooling for competition" is said to be the reason exhibit space at convention center was sold out in a matter of weeks after the official announcement of the 1954 event. The deluge of space applications received by the Society resulted in a reshuffling of the space allocated for technical meetings in order to use more of that space for exhibits.

Although every available square inch of exhibit space will be used, wider aisles than were available two years ago will be provided so that the throng of engineers and executives attending the event will be able to move more freely from booth to booth.

To Unveil New Developments

An outstanding feature of the Philadelphia event will be the great number of new machines, tools, and processes which will be unveiled for the first time.

Newest types of cutting tools, ultra-fast and extreme-precision machine tools and their accessories, giant presses, and the latest developments in workholding and other devices will be on display. All are designed to increase precision production, while relieving operators from manual drudgery.

An entire hall of the convention center will be occupied by manufacturers of precision gaging and inspection equipment ready to demonstrate the newest means and methods of attaining and maintaining the high quality control accuracy needed to meet stiff competition.

Throughout the lower halls will be found the newest in metal cutting machines and tools for faster machining of both the standard materials and the new tougher materials coming into

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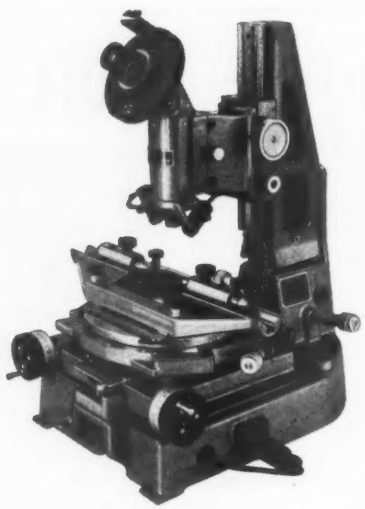

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Industrial Conferences

Thirty-five conferences and panel discussions have been arranged on the latest technical advancements and production problems.

More than a year of planning has been devoted to making the conferences and panel discussions timely and comprehensive. Top engineers and executives in the fields of plant management, automation, precision control, cutting and grinding, and other phases of manufacturing were sought out. Each speaker is a recognized expert in his field.

Topics for the conferences range through the entire field of manufacturing practices from the first design on through production to the final inspection "OK". Some dramatic highlights will be: full automation, employee planning participation, and industrial uses of Nucleonics. Production problems will be analyzed. Many of the "stiff competition" technical developments will be covered by at least one paper.

Another feature of this year's exposition will be five panel discussions dealing with production planning "buys", tooling for automatic precision control, milling problems, and workholding ways and means.

Production Planning

First of the panel discussions will be on Monday, April 26, at 3 p.m., in the ballroom of the Philadelphia Convention Center, site of the Exposition.

"How To Take The 'Bugs' Out of Your Production Planning and Control" will be the topic. Management, planning and operations experts will discuss the design and use of operation process sheets, flow charts, operators' instruction sheets, machine loading schedules, and scheduling, routing and dispatching operations and paperwork. Their discussion will cover both small and large plants, high and low production.

Members of the panel include E. Kitzman, General Superintendent, Link Belt Co.; H. R. Murphy, Planning Department Head, Grumman Aircraft Engineering Corp.; N. M. Perris, Senior Associate, Stevenson, Jordan & Harrison, Inc.; W. L. Tann, Chief Industrial Planning Engineer, Navy Ordnance; C. Verkler, Assistant Manager of Manufacturing, Caterpillar Tractor Co.; and J. R. Weaver, Manufacturing and Engineering Manager, Westinghouse Electric Corp.

Tooling for Automatics

"The Why and How of Better Tooling for Automatics" will be the topic for the panel discussion on Tuesday, April 27. The discussion will be held in the Ballroom of the Convention Center at 3 p.m. Production tooling on screw machines, turret lathes, etc. will be discussed.

. . . Continued on page 222

Sid Tool Company

WHY WAIT FOR SPECIAL TAPS?

. . . Has them IN STOCK for IMMEDIATE DELIVERY!

HIGH SPEED **SPECIAL** RIGHT HAND TAPS

SIZE	THREAD
4	32-48-60-64
6	30-32-36-48-80
6	36-40-48-56-80
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	60-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	8-11-12-14-18-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-8-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1-3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	8½-8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20-24
2	4-1/2-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-½-8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	8
4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD
0	80
1	56-64-72
2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-40
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16-24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1-11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
1-15/16	8-10-12-14-16-18-20
2	4½-10-12

• SPECIAL AND LEFT HAND DIES IN STOCK

NOTE: Oversize, Undersize, Metric, 64th and 32nd Size Taps Available for Quick Delivery. We stock Special Sizes in High Speed Milling Cutters, Slitting Saws, End Mills, and Reamers

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CUTTING TOOL SPECIALISTS
126 LAFAYETTE STREET • NEW YORK 13, N. Y.
PHONE: BE 3-4276

CIRCLE INFORM-A-GRAM KEY NO. 201

Slide Charts . . .

REDUCE COMPLICATED "FIGGERIN"

by Gene Hersh
Assistant Editor

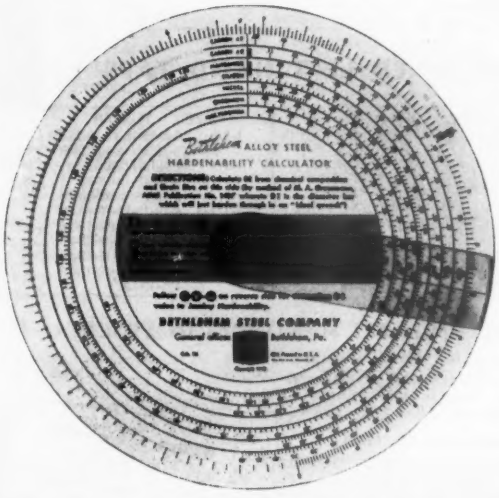
PERHAPS LIKE US, you have taken for granted the slide charts made of plastic and cardboard that help reduce complicated equations and formulae to simple terms. In our work of presenting to TOOLING and PRODUCTION readers only the best in technical editorials, we count heavily on an easily manipulated calculator designed to ascertain quickly the reproduction or printing sizes of original art or photographs.

It occurred to us to take a look into the making and distributing of such slide charts after noticing the tremendous number of requests resulting from informing our readers every once in a while, of available slide charts.

These calculators which on the most part are goodwill-and sales-building advertising devices do away with much pencil work, thumbing through handbooks computing specifications and checking back for errors.

One chart, made by Perrygraf Corp. and developed for a leading manufacturer of refrigeration equipment, juggles 17 variables, and reportedly replaces a 400 page handbook.

Perrygraf, incidently, is one of the leading producers of slide-charts for the metalworking industry.



This is Bethlehem's elaborate alloy steel hardenability calculator. Its heavy plastic construction enabled Perrygraf to incorporate design features not practical on a conventional slide chart.

Here are examples of the many types of slide charts that help reduce complicated mathematical problems to simple operations. No. 1 shows The Cincinnati Milling Machine Company's calculator for finding the chip per tooth of brass, cast iron, malleable iron and steel for high speed steel broaching tools. No. 2 is Dayton-Rogers' chart for determining the weights of flat steel. No. 3 is Scully-Jones' chart that gives dimensions for quickly drawing or machining Brown & Sharpe tapers. No. 4 is a Kennametal calculator that gives decimal equivalents, cutting speeds for steel, rpm surface speeds and other information concerning cemented carbides. No. 5 is a valve selector made by Perrygraf for the Valvair Corp. No. 6 belongs to the Webber Gage Co. and is a gage block thermal expansion comparator. No. 7 is Starrett's decimal equivalent chart and No. 8 is Dreis & Krump's developed blank size calculator.

Companies like Kennametal, Wesson, Lovejoy, Fosdick and many others have used from 10,000 to 100,000 various types of feed and speed calculators, all of considerable interest and value to their machinist customers.

These time-saving slide charts range from small simple ones like the L. S. Starrett decimal equivalent computer to large and elaborate items such as Bethlehem Steel's heavy plastic hardenability calculator.

Starrett has used over a million of its charts for advertising destribution.

The Bethlehem chart was prepared as a result of a published article by the steel firm's engineering staff on hardenability. The heavy plastic construction enabled Perrygraf to incorporate design features not practical on a conventional slide-chart.

For as long as 15 years Perrygraf has also

. . . Continued on page 218

REID QUALITY TOOL-ROOM ACCESSORIES AT MODERATE PRICES!

CAST IRON HAND WHEELS

Solid Web and Counter Balanced

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COUNTER BALANCED

Made of fine grain cast iron. Center hole and faces of hub are true to rim. Rims and handles are ground and polished to high lustre. Top quality. Low prices. Many sizes. Immediate delivery. Alterations when required at nominal prices.

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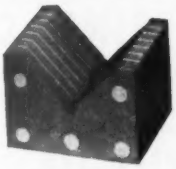
MAGNETIC CHUCK **PARALLELS and "V" BLOCKS**

No.	Size	Matched Pair	No.	Size	Matched Pair
IP2	1x2x2	$16.50	IV2	1¾x2½x2	$22.50
IP3	1x2x3	19.50	IV3	1¾x2½x3	33.75
IP4	1x2x4	22.50	IV4	1¾x2½x4	45.00

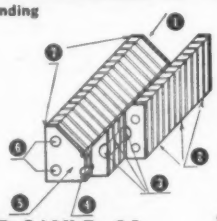
Price includes Hardwood Box.



CONSTRUCTION FEATURES OF PARALLELS & "V" BLOCKS

Patent Pending

1. "V" in "V" block ground parallel to base and centered.
2. Spring-temper, phosphorous bronze non-magnetic laminations.
3. Positive, mechanical lock, non-shift laminations. Patent pending.
4. Dowels welded to end plates.
5. End plates ground square.
6. Five hard temper silicon bronze dowels.
7. ⅛" end plates welded and ground square.



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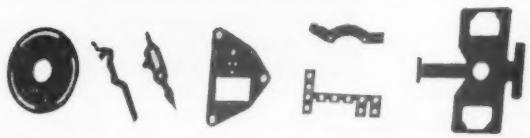

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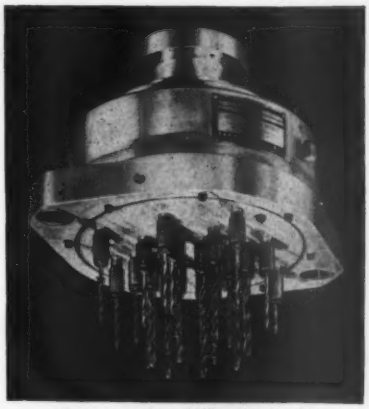
BOOTH 1620—A.S.T.E. SHOW



Zagar gearless drillhead, 12", 24-spindle; capacity up to 5/8" steel.

ZAGAR

GEARLESS DRILLHEADS excel for drilling on ALL centers

Zagar gearless drillheads can drill practically any number of holes at one pass, up to 600 or more; any material; any pattern; as close as twice the drill diameter; maintain accurate spacing. High production, complete accuracy. Furnished as complete units or adapted to any standard drill press.

◆ ◆ ◆

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Zagar 2" holding fixture.

Zagar 5-C pull type collet.

Zagar 1" indexing fixture.

—plus all the well known advantages of Zagar design; rigid holding, accurate construction, quality finish, and dependability suiting Zagar's 15-year-old standards. Also a complete line of air-operated holding fixtures and collet lathe chucks.

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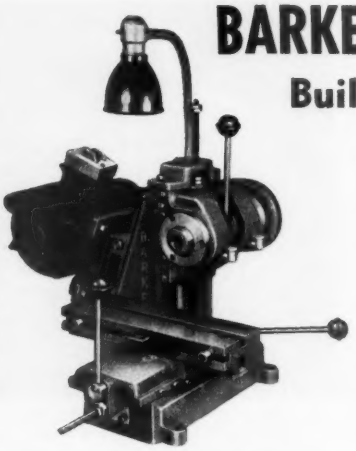
BARKER BENCH TYPE MILL

Built Right and Priced Right



- Barker Mills will do jobs that cannot be done on large machines.
- You can hold close tolerances consistently on long run jobs.
- Hundreds in use from coast to coast by nationally known manufacturers in a wide range of industries.
- General Specifications: Table 4" x 12" with 5" travel—head and spindle bearings — Head travel 3¼". Saddle travel 3". Speeds from 214 to 6000 R.P.M. Weight 160 lbs.
- If you have small parts milling jobs it will be wise to check into the possibilities of the Barker Mill.

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Complete with 1/3 H.P. Motor as shown.

Special accessories on model illustrated at the right are available at slight additional cost.

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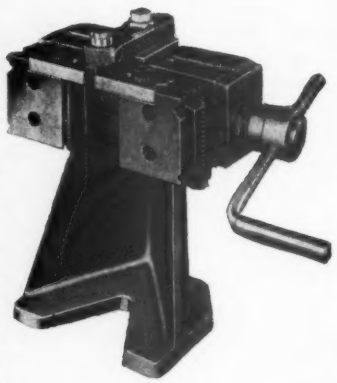
"JOHN'S" UNIVERSAL DRILL JIG

Minimizes Tooling - - - Increases Production



For cross drilling or end drilling round, hexagon, or square stock or standard or odd shaped castings from ⅛" to 8" O.D. the self-centering "JOHN'S" Drill Jig cuts tooling and production costs to minimum for 10 to 100,000 pieces. Standard removable slip fit bushings and holders available to drill center or mean off-center holes from #60 to 1-1/32" drill. Special bushing holders for multi-drill operations easily tooled. The self-centering action will hold within .004 T. I. R. or better regardless of jig wear or piece part O.D. variation. Ideal for holding rough castings. Working jaws that hold part, and bushing holders, can be doweled to provide any number of permanent drill jigs from one jig. Bases available for mounting jigs from 1" to 18" off working surface. Handles reversible; can be put on either side of jig. Can also be used with floating jaws for outside location points. Jigs available in three sizes 6", 8", 14", jaw openings 2½", 3¼", 7½". For information on hundreds of uses for jig or tooling recommendations for specific job, write:

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This cutting head style A for through-boring

This cutting head style B for bottoming and facing

This cutting head style C for internal threading

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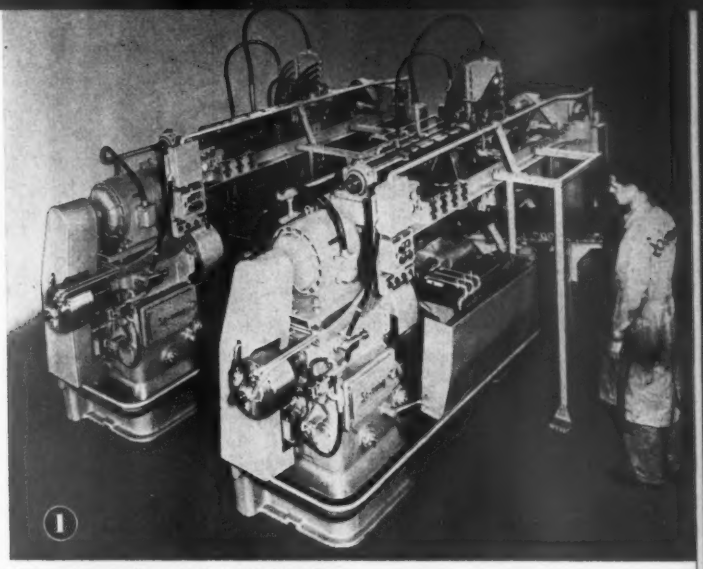


Photos courtesy of Seneca Falls Machine Co.

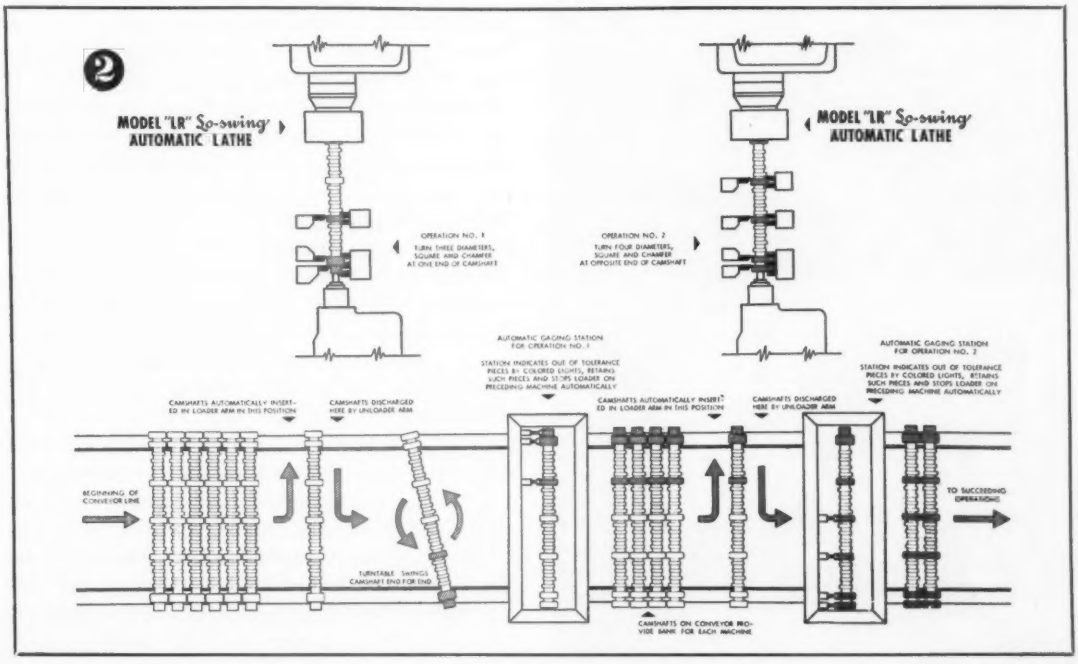
Work Held Between Centers on Lathes Are Now

AUTOMATICALLY LOADED AND UNLOADED FOR HIGH PROTECTION

COMPLETELY AUTOMATIC, a practical system has been devised for the loading, machining, gaging, unloading, and transfer of workpiece between machines—where the workpiece is a shaft to be held between centers.

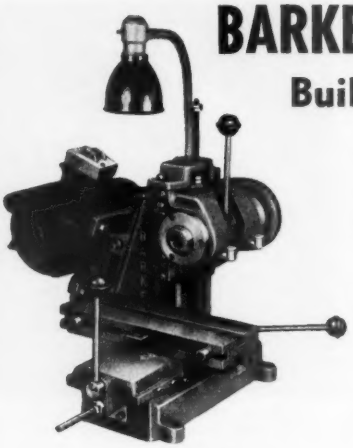
The automatic work loading and transfer equipment is shown in Figure 1 as applied to the first two machines—Lo-Swing automatic lathes—in an automated camshaft production line. The flow of work is shown diagrammatically in Figure 2. The same basic method of handling the workpiece is now being adapted to other operations on the same production line.

The lathes are sufficiently spaced to permit easy tool changing and also to allow for a bank of 20 camshafts to be accumulated on the con-


MODEL "LR" Lo-swing AUTOMATIC LATHE
OPERATION NO. 1
TURN THREE DIAMETERS, SQUARE AND CHAMFER AT ONE END OF CAMSHAFT
MODEL "LR" Lo-swing AUTOMATIC LATHE
OPERATION NO. 2
TURN FOUR DIAMETERS, SQUARE AND CHAMFER AT OPPOSITE END OF CAMSHAFT
AUTOMATIC GAGING STATION FOR OPERATION NO. 1
STATION INDICATES OUT OF TOLERANCE PIECES BY COLORED LIGHTS, RETAINS SUCH PIECES AND STOPS LOADER ON PRECEDING MACHINE AUTOMATICALLY
AUTOMATIC GAGING STATION FOR OPERATION NO. 2
STATION INDICATES OUT OF TOLERANCE PIECES BY COLORED LIGHTS, RETAINS SUCH PIECES AND STOPS LOADER ON PRECEDING MACHINE AUTOMATICALLY
CAMSHAFTS AUTOMATICALLY INSERTED IN LOADER ARM IN THIS POSITION
CAMSHAFTS DISCHARGED HERE BY UNLOADER ARM
CAMSHAFTS AUTOMATICALLY INSERTED IN LOADER ARM IN THIS POSITION
CAMSHAFTS DISCHARGED HERE BY UNLOADER ARM
BEGINNING OF CONVEYOR LINE
TURNTABLE SWINGS CAMSHAFT END FOR END
TO SUCCEEDING OPERATIONS
CAMSHAFTS ON CONVEYOR PROVIDE BANK FOR EACH MACHINE

BARKER BENCH TYPE MILL

Built Right and Priced Right



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- General Specifications: Table 4" x 12" with 5" travel—head and spindle bearings — Head travel 3¼". Saddle travel 3". Speeds from 214 to 6000 R.P.M. Weight 160 lbs.
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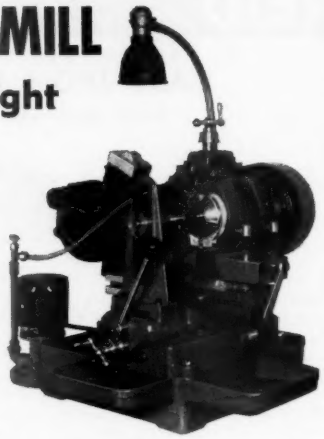

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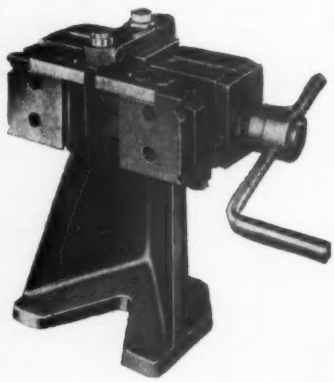

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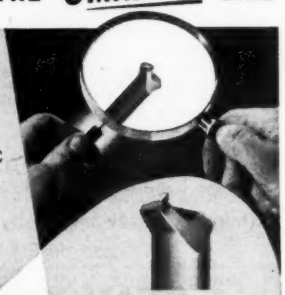

This cutting head style A for through boring

This cutting head style B for bottoming and facing

This cutting head style C for internal threading

For top performance you can always depend on BOKUM ORIGINAL BORING TOOLS

Available in both high speed steel, carbide-tipped, and solid carbide.

Two basic formulas contribute to the outstanding performance of Bokum Tools: 1) the mathematical formula of the design and 2) that of the material.

Use a Bokum Tool and you'll see the difference —Send for catalog.

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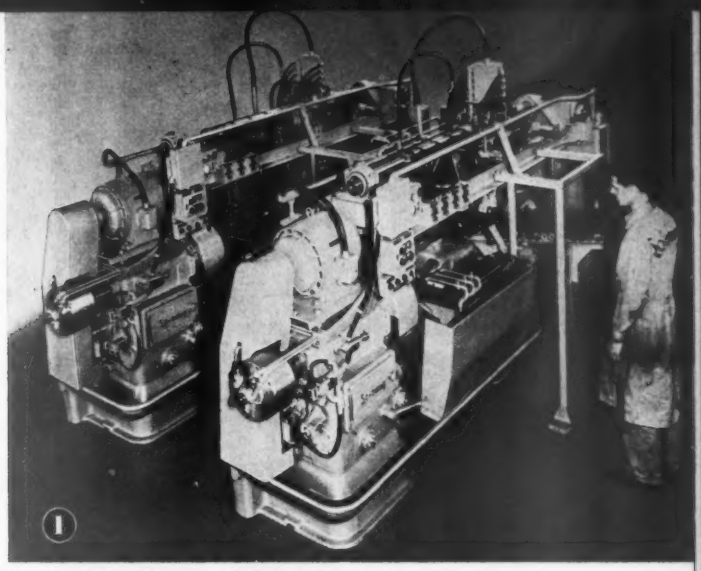
BOKUM TOOL COMPANY • 14775 WILDEMERE DETROIT 38, MICHIGAN

CIRCLE INFORM-A-GRAM KEY NO. 204C



Photos courtesy of Seneca Falls Machine Co.

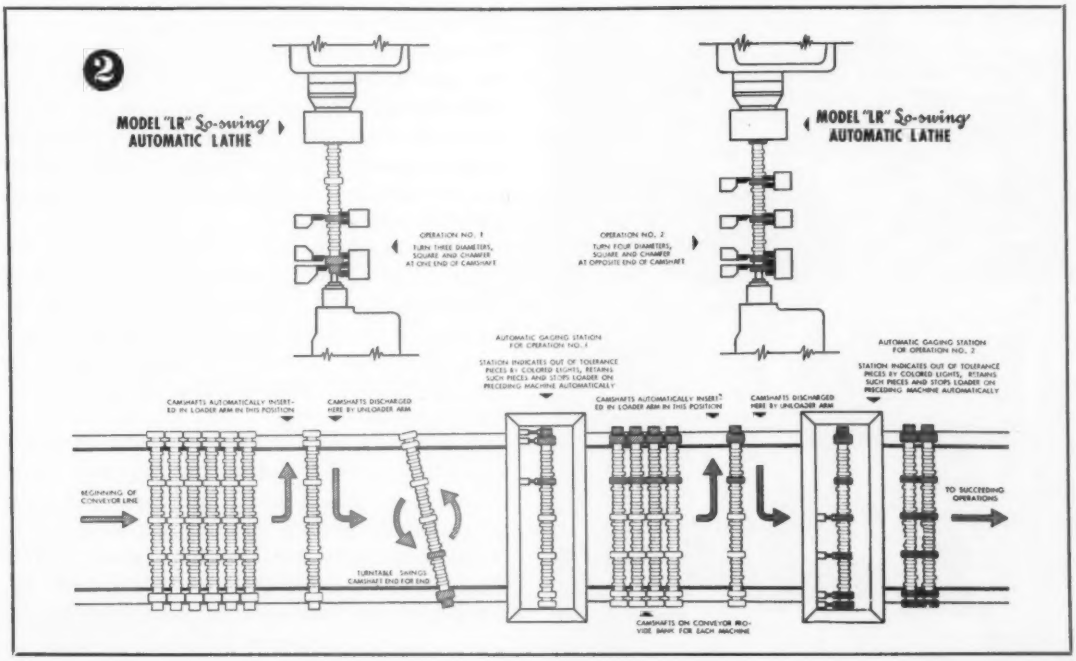
Work Held Between Centers on Lathes Are Now

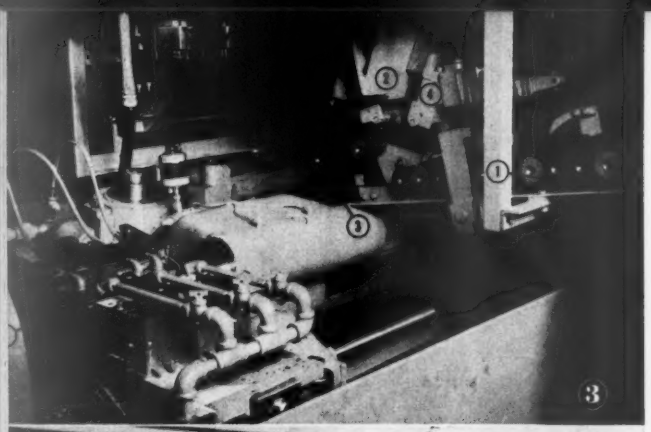
Automatically Loaded and Unloaded for High Protection

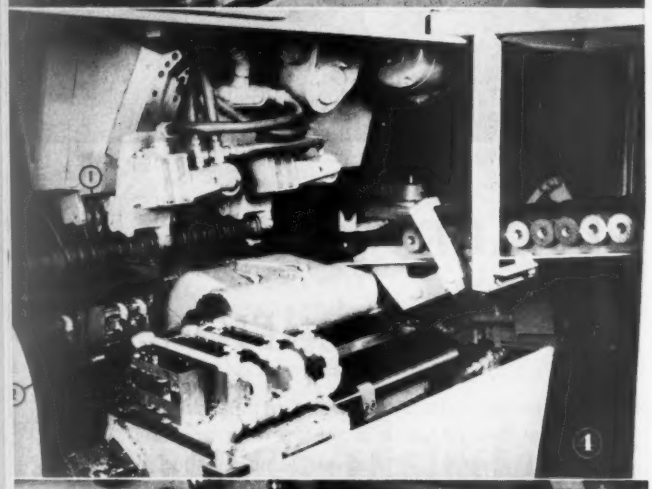
COMPLETELY AUTOMATIC, a practical system has been devised for the loading, machining, gaging, unloading, and transfer of workpiece between machines—where the workpiece is a shaft to be held between centers.

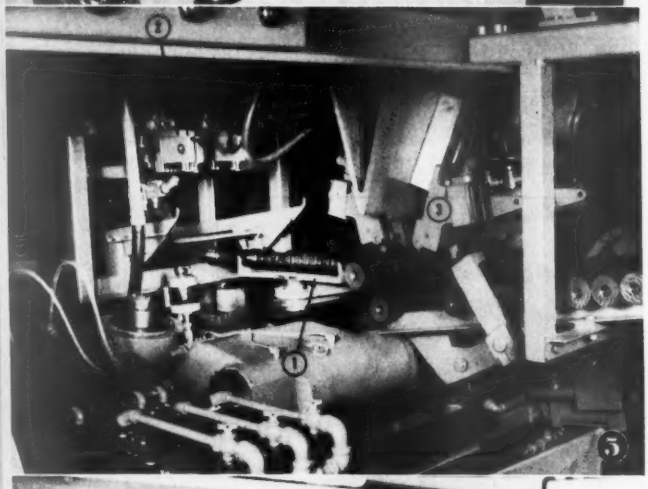
The automatic work loading and transfer equipment is shown in Figure 1 as applied to the first two machines—Lo-Swing automatic lathes—in an automated camshaft production line. The flow of work is shown diagrammatically in Figure 2. The same basic method of handling the workpiece is now being adapted to other operations on the same production line.

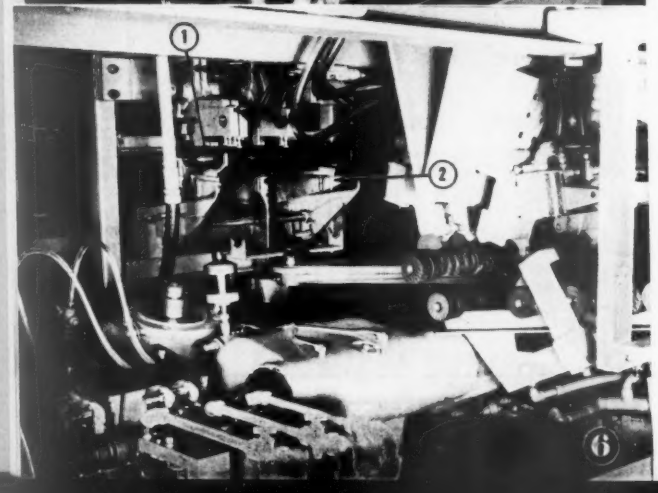
The lathes are sufficiently spaced to permit easy tool changing and also to allow for a bank of 20 camshafts to be accumulated on the con-


MODEL "LR" Lo-swing AUTOMATIC LATHE
MODEL "LR" Lo-swing AUTOMATIC LATHE
OPERATION NO. 1
TURN THREE DIAMETERS, SQUARE AND CHAMFER AT ONE END OF CAMSHAFT
OPERATION NO. 2
TURN FOUR DIAMETERS, SQUARE AND CHAMFER AT OPPOSITE END OF CAMSHAFT
AUTOMATIC GAGING STATION FOR OPERATION NO. 1
STATION INDICATES OUT OF TOLERANCE PIECES BY COLORED LIGHTS, RETAINS SUCH PIECES AND STOPS LOADER ON PRECEDING MACHINE AUTOMATICALLY
AUTOMATIC GAGING STATION FOR OPERATION NO. 2
STATION INDICATES OUT OF TOLERANCE PIECES BY COLORED LIGHTS, RETAINS SUCH PIECES AND STOPS LOADER ON PRECEDING MACHINE AUTOMATICALLY
CAMSHAFTS AUTOMATICALLY INSERTED IN LOADER ARM IN THIS POSITION
CAMSHAFTS DISCHARGED HERE BY UNLOADER ARM
CAMSHAFTS AUTOMATICALLY INSERTED IN LOADER ARM IN THIS POSITION
CAMSHAFTS DISCHARGED HERE BY UNLOADER ARM
BEGINNING OF CONVEYOR LINE
TURNTABLE SWINGS CAMSHAFT END FOR END
CAMSHAFTS ON CONVEYOR PROVIDE BANK FOR EACH MACHINE
TO SUCCEEDING OPERATIONS









veyor line between the two machines. This build-up or bank of work is important as only one machine need be shut down at a time for tool replacement or other service. Cycle time on individual machines may vary without affecting smooth operation of the line.

The carbide tooling is designed for rapid replacement. The front turning tools are fitted with adjusting screws which are pre-set in the toolroom, after tools are ground. The rear facing and chamfering tools are mounted and pre-set in magazine-type tool blocks which are readily exchanged in the machine when required.

Figure 3 is a tailstock end view of the first lathe, showing the parts arriving on a gravity feed conveyor (1) and the work-transfer carrier (2) in the work-discharge and pick-up position. A semi-finished camshaft has been dropped into the turntable cradle (3) while a rough piece has been injected into the loader fingers (4), which clamp onto the piece. The workpiece (5) between centers is being turned.

At the end of the machining cycle, a switch is actuated releasing the spindle clutch. This stops spindle rotation and energizes the stepping switch that controls all movements of the transfer loader equipment. At the end of the loading phase of the cycle, the chuck jaws close on the workpiece and the main drive clutch is engaged, starting spindle rotation and the machining phase.

In Figure 4, the work-transfer carrier with a rough piece (1) has advanced into the loading position. The front and rear tool slides are relieved from the work, the headstock spindle has just stopped revolving, and the chuck jaws have opened. An unloader arm on the transfer carrier will now reach down for the semi-finished piece (2), which will be lifted out of the way for the rough piece (1) to be injected between centers.

The transfer carrier is shown in Figure 5 having moved to the discharge and loading position over the conveyor line. The semi-finished part has been dropped into the turntable cradle (1), which has already started to reverse the piece end for end for entry into the gaging station (2).

In Figure 6, the turntable has completed its reversing function, and the semi-finished piece (1) has been raised into gaging position by an air-operated elevator cradle (2). If the machined diameters are all within tolerance, the piece will be immediately released and deposited on the conveyor rails. Otherwise, it

will be held in the gaging station, and automatic cycling at this first machine will stop at the end of the machining sequence in progress. Signal lights indicate which diameter is off tolerance; and, after a tool change is made, the faulty piece is released from the gaging station by push button. Automatic cycling can then be resumed.

Immediate gaging of the part in this way insures that only within-tolerance pieces are deposited on the conveyor for transfer into the next machine. Also, the trouble is caught immediately, thereby reducing scrap and salvage operations.

Two micrometer screw adjustments are provided on the multiple gaging heads, by which minimum and maximum dimensional limits may be quickly and accurately changed or corrected if necessary.

The work-transfer carrier for the second machine is shown, in Figure 7, in unloading and pick-up position over the conveyor line. A finished part (1) is just being released from the unloader fingers, and a semi-finished part (2) has been injected in the loader fingers. The part held between centers is nearing completion of the turning operation.

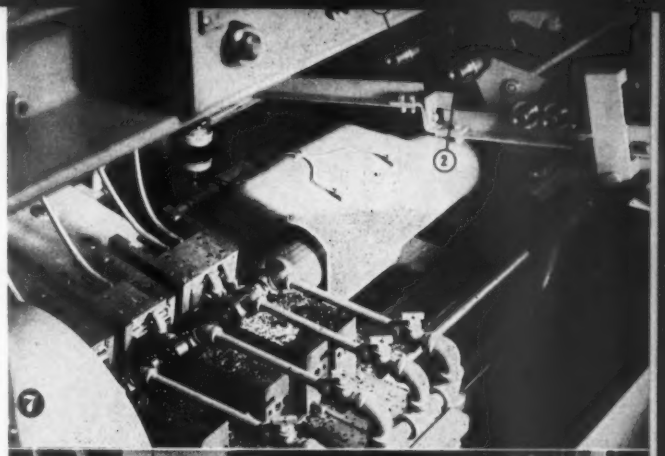
In Figure 8, the work-transfer carrier on the second lathe has carried the workpiece to be machined to the loading position. The piece just machined has been picked up and is held in elevated position by the fingers on the unloader arm, while the piece to be machined is shown being injected between the lathe centers. The loader arm will move sideways to the unloading and pick-up station.

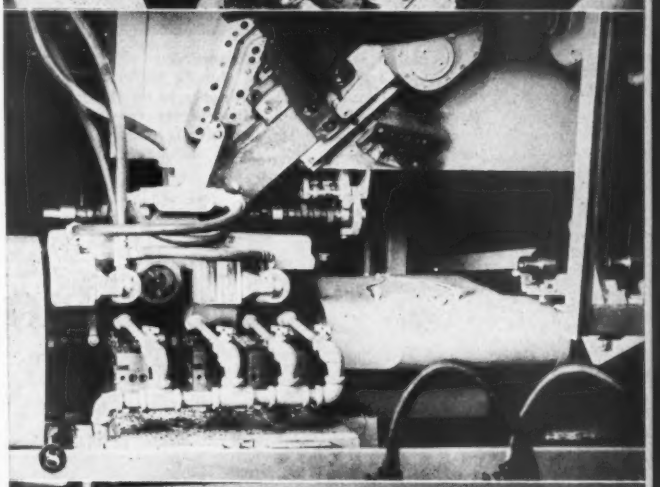
A view through the rear of the second machine, Figure 9, shows the finished piece just released and headed down the conveyor to the inspection station. Loader fingers on the transfer carrier hold a semi-finished piece.

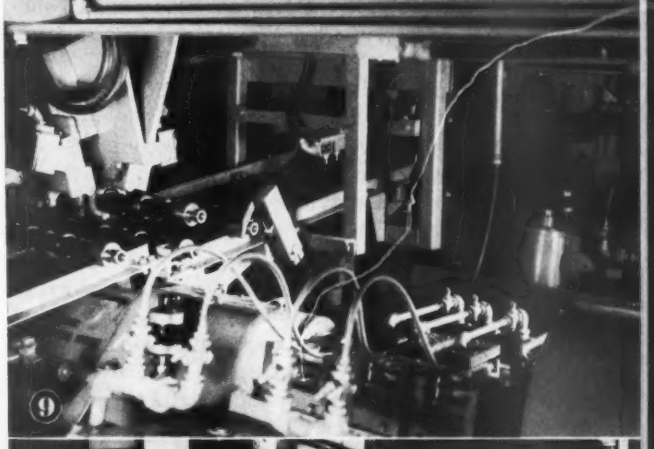
Figure 10 shows the finish turned part in the air-operated elevator cradle, ready to be raised into the gaging assembly. The finish turned part in the foreground has just been released from the gaging station and is on its way to other machining operations.

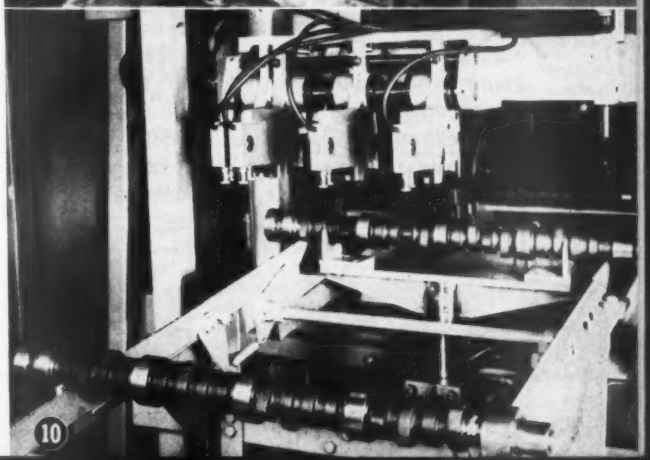
This type of work handling on a continuous high production operation has numerous advantages, including the reduction of labor and unit costs, improved quality control, and simplified, compact, plant layout.

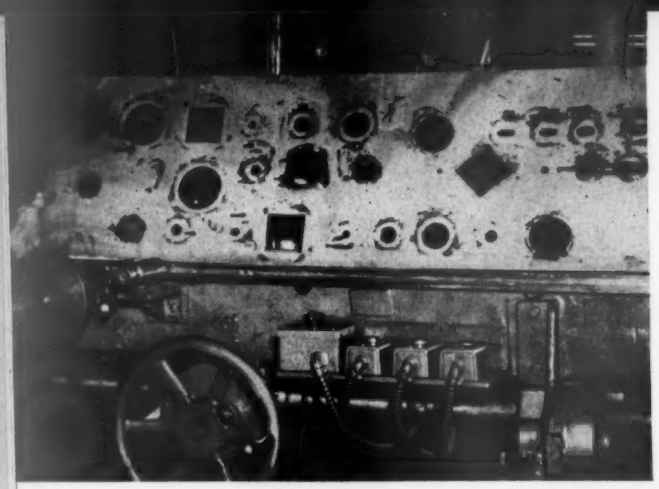
Operator fatigue is reduced to a minimum, work spoilage and salvage expense becomes negligible, and accidents due to slow-up of human reflexes are practically eliminated.

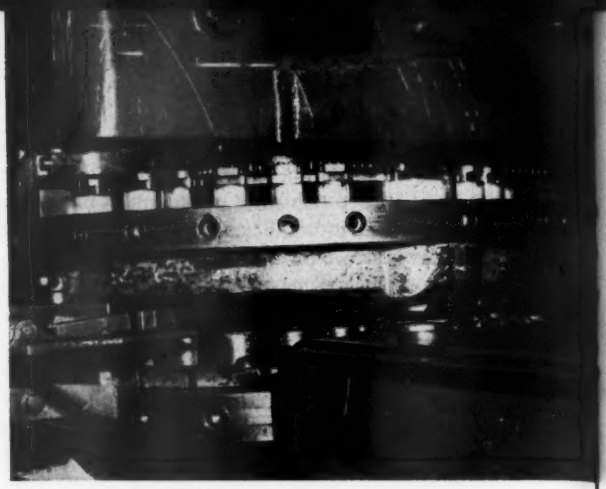












A sample of the many different types of holes that can be punched on the Wiedemann press is shown at left. For demonstrative purposes, the 22 different shape holes were punched on a scrap piece 3/8" thick. It took the operator less than five minutes to do the job. At right is a close-up of the punch and punch holders. The dies located on the lower turret in separate die holders are bolted to the face of the turret with independent location adjustment. Each die holder is plainly marked with the diameter of the appropriate punch and the corresponding maximum thickness of sheet that should be punched.

Multiple Punching . . .

UPS PRODUCTION 10 TIMES

AT THE JAEGER Machine Company there is a general feeling similar to that felt by automobile and television owners. Like most people who are certain they could not survive with out these commodities, we wonder how we ever got along before the introduction of the Wiedemann turret-type punch press.

Designed to handle small quantity piercing of sheets and plates in a fraction of the time and with less labor than required by conventional methods, this multiple-punch press has taken the high cost out of our short-run punching operations. Because the principal on which the turret punch press operates is inherently simple and economical, the cost of producing special jobs and odd lots also is reduced.

Now, precision alignment on anyone of 11 to 22 punches and dies can be had within six seconds, whether the punches and dies are of irregular shape or round, or in combination. Since all necessary punches and dies are in the turret, the time of trips to and from the toolroom is eliminated. In addition, the dies are interchangeable.

An example of what can be done with the turret punch press is our most common work with the machine. One man, now, can in one setup punch 18 holes of four different sizes on a sheet of steel 127" long, 33-7/8" wide and 3/8" thick in an average time of 4-1/2 minutes. Furthermore, a constant accuracy of ± 0.002" is realized. And our machine can pierce up to 22 different size holes. This same work on a conventional type press would take at least two men over 40 minutes in five different setups to complete. And because the element of human error is ever present, several minutes frequently must be added to this time for reaming or other finishing operations.

Our turret punch press is equipped with a direct measuring and positioning gage table. With this unit, the operator controls the location of the work under the required punch, the rotation of the turrets, and the actual punching of sheets or plates. The work, which is secured by clamps against the end stop, is moved by two graduated hand wheels in conformance to a dimension chart giving hole location and station numbers. The chart holder moves one space with each stroke of the press to show the location and station number of the next hole. The chart, itself, is secured on a cylindrical holder and contains such information as the part number of the workpiece, the turret station or punch to be used, size of the hole and the distance for both the transverse and in-and-out settings.

One job we have done with material 3/8"

by Earl A. Fickes
Chief Tool Engineer
Jaeger Machine Company
Columbus, Ohio

. . . Continued on page 212

NEW
SPIRAL FLUTE
CARBIDE TIPPED
HARD STEEL
DRILL

SERIES 300

DIA.	DIA. OF BODY BACK OF CARBIDE	APPROX. LENGTH OF FLUTE	OVER ALL LENGTH	DIA. SHANK	APPROX. R.P.M.	PRICE
1/16"	5/64"	1 1/2"	2 3/4"	1/8"	1000	$ 7.00
5/64"	11/64"	1 5/8"	3"	11/64"	800	8.50
3/32"	7/64"	2"	3 1/2"	7/64"	800	10.50
1/8"	11/64"	2 1/4"	3 3/4"	11/64"	700	13.50
5/32"	13/64"	2 1/2"	4"	13/64"	700	16.50
3/16"	19/64"	2 3/4"	4 1/2"	19/64"	600	19.50
11/64"	23/64"	2 7/8"	4 3/4"	23/64"	600	22.50
7/32"	27/64"	3 1/4"	5"	27/64"	500	25.50
15/64"	31/64"	3 1/4"	5 1/2"	31/64"	500	28.50
1/4"	17/32"	3 1/2"	5 3/4"	17/32"	400	31.50
17/64"	35/64"	3 5/8"	5 5/8"	35/64"	400	34.50
9/32"	9/16"	3 7/8"	5 7/8"	9/16"	450	37.50
11/32"	11/16"	4"	6 1/2"	1"	300	41.50
11/16"	15/16"	4 1/4"	6 3/4"	1"	200	45.50

Advantages: 1. Spiral flutes — better chip disposal. 2. Better support for carbide tip. 3. Self-centering point — no weaving. 4. Hardened H.S.S. body. 5. Drills without annealing. 6. Low cost construction.

STILL AVAILABLE

SERIES 100

Hardened steel drill. Solid carbide cutting end. Will not anneal. Holds size perfectly. No coolant required on shallow holes. Available in 10 sizes: 1/8" to 5/8" dia.

SERIES 200

Drills center in hardened steel in one operation. Cuts clean centers without annealing and without use of coolant. Available in 4 sizes: 3/32" to 9/32" (drill dia.).

Write for data — Also our tool salvage catalog

NATIONAL TOOL SALVAGE CO.
6511 EPWORTH BOULEVARD
DETROIT 10 MICHIGAN

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SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

IMMEDIATE DELIVERY FROM STOCK

3AT, 3C 1A, 4C 5C

480 (AC-50)

All collets in hexagon, square and round.

KLUTCH-KOLLET Step-collet for accurate chucking to 2¾" dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.

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LEVER-TYPE DRAWBAR ½" cap.

Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.

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HAND DRAWBAR ½" cap.

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CIRCLE INFORM-A-GRAM KEY NO. 209B

YOST DRILL PRESS VISE

• This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

OFFERED IN TWO SIZES

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?
Write today for bulletin on the extensive Yost line

YOST MFG. COMPANY
1000 MAIN STREET
Meadville • Pennsylvania

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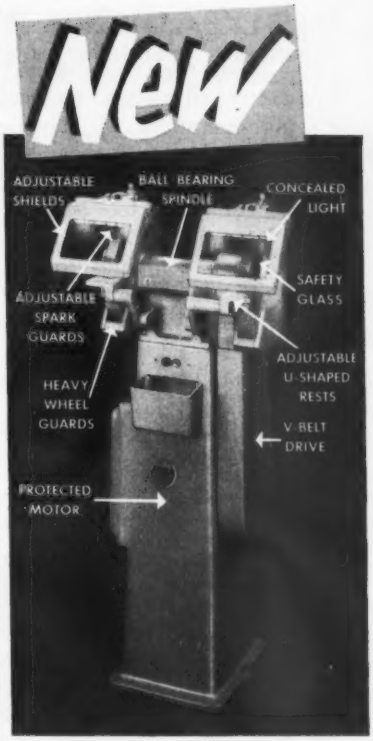

SOUTH BEND Pedestal GRINDER

A ruggedly built grinder that will give long, dependable service under hard use. Ideal for rough or precision grinding. The motor is enclosed in the pedestal and drives through a V-belt. This removes the weight of the grinding wheels from the motor bearings and practically eliminates vibration. Moreover, it isolates the motor from abrasive dust and provides greater work clearance.

SPECIFICATIONS

Wheel Size: 8" dia. (½ h.p. motor), 10" dia. (¾ h.p. motor).

Spindle: Approximate speed 2450 r.p.m. Sealed ball bearings.

Motor: Standard 2875 r.p.m. 50 cycle or 3450 r.p.m. 60 cycle. Also D. C.

Over-all Dimensions: 49½" high, 18" wide, 20½" deep (10" Grinder ½" wider).

8" — $245.00; 10" — $248.00 each less motor and remote control equipment. Time terms: 10% down — balance in 12 months. f.o.b. factory.

SOUTH BEND LATHE
SOUTH BEND 22, INDIANA
Building Better Tools Since 1906

South Bend MACHINE TOOLS

CIRCLE INFORM-A-GRAM KEY NO. 209D

New Type of Multiple Drilling Machine

A new type of semi-automatic, hydraulically controlled machine tool designed to speed drilling operations on medium sized and large metal parts in both small lot and semi--mass production quantities is announced by a Detroit machine tool builder.

Named the Opposed Spindle Drill, the new machine combines the speed of a two-way drilling machine with the flexibility of a radial drill and the accuracy of a horizontal boring machine. Closely spaced holes that would prevent conventional multiple drill head and bushing plate drilling methods are simply produced on this opposed spindle drill.

The new machine can be readily adapted to production drilling operations on medium sized and large parts in a wide range of industrial applications. It is particularly adapted to drilling operations on a wide range of sizes of tube sheets in condensers, chillers, heaters, evaporators and coolers.

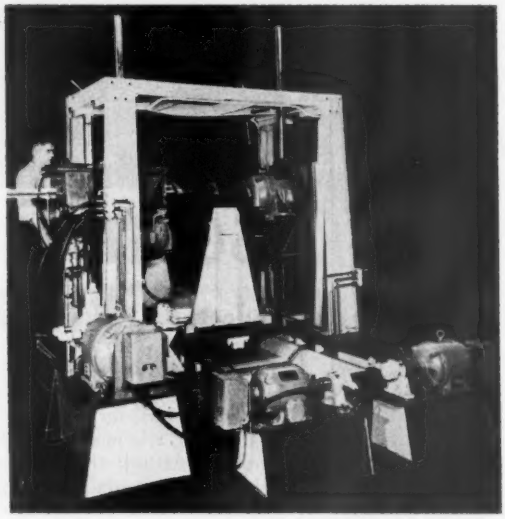

Photo courtesy Walter P. Hill, Inc.

The new opposed spindle drilling machine is drilling two ¾" dia. holes simultaneously in a 1200-hole, 5' diameter forged steel condenser tube sheet.

Condenser tube sheets and baffles can be drilled by the opposed drilling process in 1/10th the time required by conventional layout spotting and radial drilling methods, depending upon thickness and other variables.

Machine Description

Basically the machine consists of two fabricated steel vertical structures, each supporting two columns and mounted opposite one another on a welded steel base. The machine table is traversed on ground steel ways on the base between the two structures.

Motorized Hill power heads having integral hydraulic feeds are mounted on each vertical structure. These units can feed individual drills or drill heads at varying speeds into opposite sides of the work at different levels. The power heads are positioned vertically by twin hydraulic cylinders that are guided on the two ground round columns. The Hill heads are designed to resist 23,000-lb. unbalanced thrust loads.

The machine table is fed between the spindles by a single hydraulic cylinder.

Horizontal table location as well as vertical location of each head is controlled by visible flush-pin type locators that work in conjunction with individual index plates.

A single Hill hydraulic power pack unit, which includes a motor, 1,000 psi pump and a tank, provides power for the machine.

Machine Operation

To drill the 1200, ¾" dia. holes located on 15/16" centers in the 5' dia., 4" thick forged steel condenser tube sheet, shown in the photograph, the sheet is bolted in position on a winged fabricated steel fixture on the machine table. This fixture is designed to accommodate tube sheets varying from 2' to 6' in diameter and up to 6" thick.

Next the power heads are each positioned to individual locations corresponding to the horizontal centerline of a row of holes. This is accomplished by moving each head by means of a hydraulic valve control until a flush pin locator drops into position in the vertical index plate. On this setup, one head drills the holes in the upper half of the condenser tube sheet and the other drills in the lower half. The heads are locked in position for the drilling operations on each pair of horizontal rows of holes.

The table is next positioned through its index plate so that the heads will drill the outside hole in their respective row. Then an automatic drilling cycle is initiated by a single pushbutton control. Both heads automatically go through a controlled feed cycle of rapid advance, drill through and rapid retraction.

The table is then indexed to the next hole position for another automatic drilling cycle. Upon the completion of a row of holes, the heads are repositioned vertically to new hole rows and the table is indexed in a reverse di-

. . . Continued on page 218

TWENTIETH CENTURY MANUFACTURING CO.

Uneeda LIGHT

DIRECTS A BEAM OF WHITE LIGHT ON YOUR CLOSE PRECISION WORK

Tool and Die Makers acclaim it for utility — getting into nooks and crevices hard to reach with ordinary light — for lining up punches in dies or working with the scribes in close places. Uneeda Light does not reflect back to your face. Completely adjustable and portable. Ideal for inspectors seeking burrs, flaws, etc.

PRICE COMPLETE WITH 2 SIZE BULBS $13.75

Write For Bulletin No. 30

GARBERDING **STOP PINS & FINGER STOPS**

STOP-PINS

AVAILABLE IN 5 SIZES

Stop-Pins are complete self contained units that hold securely in stripper plate. All sizes have 1/32" wall permitting insertion close to die or punch. No threads inside stops for springs to catch on.

FINGER STOPS

IN 3 SIZES

Finger Stops made in uniform width to fit any standard width slots. Just grind ends to fit. Write for Bulletin No. 25.

TWENTIETH CENTURY MANUFACTURING CO.

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THE KOCH TEST INDICATOR

IS THE ONLY TOOL MAKERS INDICATOR ON THE MARKET WITH TWO WORKING ENDS, FOR PRECISION WORK, ONE END TO TEST OUTSIDE SURFACES, THE OTHER INSIDE.

WHAT EVERY TOOL ROOM TOOL MAKER OR MACHINIST NEEDS.

Plunger moves away from, instead of against the lever, protecting delicate parts from sudden or excessive jolts. Each graduation on scale represents 1/1000" movement of plunger $10.00 plus postage.

Positive-Lock SURFACE GAGE

Drawbolt has positive lock to prevent slippage. Spindle: 9"x5/16". Block: 3¼"x2½"x1" with 90° angle groove in base. Surface Gage is precision ground. $8.75 plus postage.

Ask your dealer for these tools and buy through him. If he cannot furnish them, Write to us.

ANDREW GENALES, NYACK, N.Y.

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Dealers Wanted

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With DYKEM Steel Blue
Without DYKEM Steel Blue
Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.
Write for sample on company letterhead
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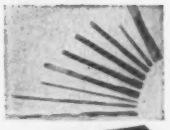
SHOW STOPPERS at BOOTH 235

Any and every KEYWAY (1/16" to 1") broached by hand with arbor press in one minute for as little as one cent each, with du MONT *Minute Man* KEYWAY BROACH KITS.

See demonstration at the Show



Special Broaches? See 'em at the Show or mail us your prints — pull type, push type, keyseating machine. Get 'em from du Mont quick, at low cost because we're tooled up for 'em. (This means broaches under 36" length and 20" cutting sections, *not* round, spline, rifling or irregular shaped, nor square broaches less than ¼" across flats.

Tool Bits by du Mont — Square and Rectangular, Super High Speed, Ground. du Mont Bits are precisely blended and *balanced* to *do most* cutting, take a keener edge, stay on the job longer. A trial will convince you. See 'em at the Show.

Everyone who visits Booth 235 will see how to save minutes and money with the *Minute Man* MAGNETIC BASE for positioning dial indicator gages at the most convenient and effective spot. Puts 'em there *quick*, and *keeps* 'em there.

The du MONT CORPORATION, Greenfield, Mass.

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☐ Minute Man SPECIAL BROACHES
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Company .....

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. . . Production, from page 208

thick, 108" long, 35" wide, called for the punching of 135 holes, varying in size from 13/32" to 1-1/16"— and don't forget this was on one setup. In doing this work, as with all jobs, the gage bar determines the horizontal positioning of the sheet while one of the hand wheels controls in-and-out-maneuvering. All that is required of an operator on such jobs is to plug a pin into the gage to give the proper side spacing of the hole and set the dial wheel to the prescribed distance from the back edge of the piece to the center of the hole.

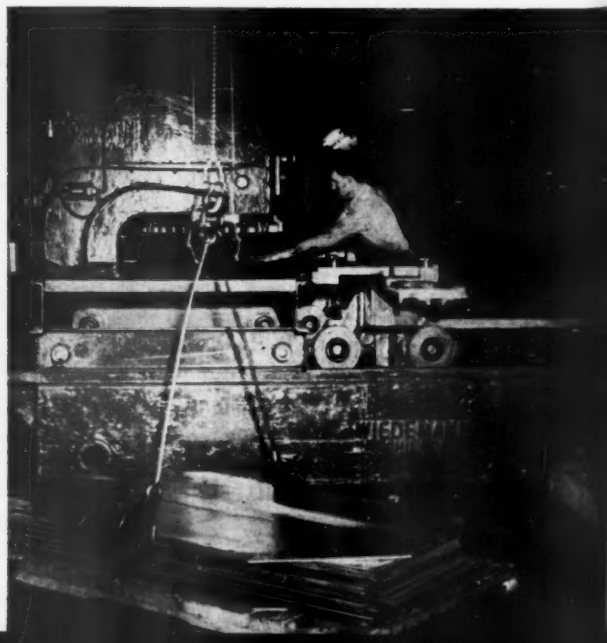
Layout time also is reduced to a minimum as the results of the various gaging arrangements designed especially for use with the turret punch press. The use of templates is involved only in the initial setup for checking purposes. Once the tool engineering department makes available the blueprints for a specific task, the data is transferred from the drawings to the machine. The toolroom makes the gage bar to the blueprint specifications.

Now compare this method of operating with that associated with single-punch procedures where holes had to be laid out via templates, photo-transfer layouts or hand layouts of each sheet for each size hole punched. Of course, it shouldn't be implied that there is no place in our plant for single-punch operations. We still use them for fabrication under and over the limitations of the Wiedemann press. But the fact remains, the turret punch press is now performing the duties of six single-punch presses which now are being utilized for other types of work. Our press operates at 60 strokes per minute and because of the short stroke involved, the work comes off the press virtually free from burrs and distortion.

Small sheets or large can be punched on this Wiedemann Model R-61 turret type punch press used by the Jaeger Machine Co.

There are limitations to the Wiedemann machine, we realize, such as the thickness of material that can be punched and the fact the workpiece must be flat. However, these limitations do not adversely affect our work to any great degree. Because of the nature of our products, i.e., centrifugal pumps, hoists, building mixers, truck mixers and front end loaders, most of our hole punching is routine. However, for special jobs, we quickly can procure any size of shape punch up to the capacity of the machine.

The photo at left shows a steel plate which takes two men to lift. Yet one man was able to punch the holes shown with speed and accuracy. At right can be seen how this is done. An electrically operated hoist is used to lift heavy material onto the turret punch press table. The large smooth platform enables the operator to get the stock into punching position with ease.



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Any machine shop, large or small, can save time and money on milling and boring work with the new Perkin-Elmer Model 11 Machine Tool Microscope. For hole location, its wide field of view (¼") or 30x magnification makes it possible to gage accurately to a ten thousandth—*at a glance.*

Mount the Model 11 on an offset bracket or directly in the spindle—it will fit nearly any machine tool. When offset it can be used for transferring hole locations from template to workpiece. The image always appears erect and moves in the same direction as the work, making it ideal for checking contours, slots, surface conditions. The Model 11 Microscope is compact, sturdy, rugged—designed for long life, accurate service.

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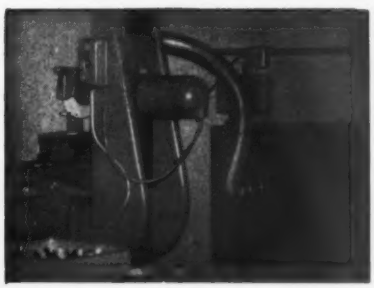

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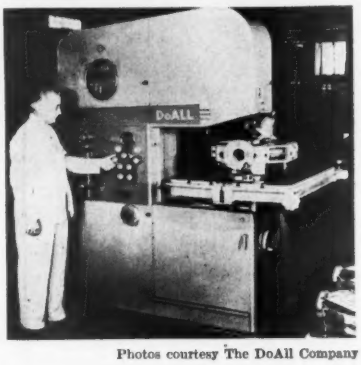
CIRCLE INFORM-A-GRAM KEY NO. 213E

New Approach To Manufacturing Methods

Industrial engineers, production men and product designers now have at their disposal, (and will see at the ASTE convention in Philadelphia) a new type of "manufacturing team" consisting of a machine and cutting tool which provide the means for surpassing previous records in the production machining of metal.



Photos courtesy The DoAll Company

Fig. 1. View of the Model 26-3 Semi-automatic machine. It features hydraulically actuated machine movements and adjustments, such as table feeds, feed pressure, variable speed control, guide post adjustment, automatic band tensioning and table tilt.

The new "manufacturing team" referred to is the DoAll new line of unique semi-automatic band machines and the revolutionary DoAll Demon high-speed steel saw band* — the first practical high-speed steel band tool!

High-Speed Steel Saw Band

Now, with the advent of the Demon band, the expansion and application of band machining is considerably extended. The advantages of high-speed steel have been previously experienced with the performance of high-speed steel tools used in many operations.

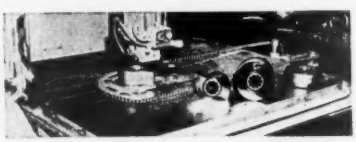


Fig. 2. Operator here is cutting a 2-inch thick steel cam using the "contour feed" control on a semi-automatic band machine. The maneuverability of the band tool is one of the characteristics of band machining that permits cutting directly to a layout line, whether straight or irregular in shape. These cams were cut in an average of 5 minutes apiece.

*Registered trademark and patent applied for.

The high-speed steel blade is now being produced in two of the well known DoAll tooth styles. The "Demon Precision" blade comes in 3 varieties of pitch and 5 different widths from 1/4" through 1". The Buttress type tooth developed in 1943 for larger work sections is now known as the "Demon Buttress" and comes in 3 different pitches and 3 widths, 1/2" through 1".

Exclusive Machine Features

Here are some of the features emphasized in the design of the semi-automatic band machines (Figure 1)

1. Increased horsepower to assure continuous production under heavier cutting loads.
2. Ruggedness and rigidity of machine construction for the reduction of vibration and consequent improvement in accuracy and finish so necessary in precision cutting and in making extra heavy cuts.
3. "Push button" machine operation handled from a centralized control panel.
4. Exclusive and complete "in-built" coolant facilities.
5. Wide, infinitely variable speed ranges (one typical range 40 to 10,000 fpm) permits selection of the ideal band tool velocity for the dimensional, physical characteristics and composition of the material being cut.

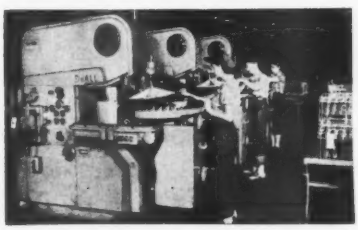


Fig. 3. Typical of the trend toward band machine use is at a jet engine plant for automatic trimming of the turbine blades in jet engine rotors. The fixtures on these machines can be adjusted to achieve a wide range of diameters.

Advantages to Industry

From the time of its first inception the band machining technique has demonstrated marked advantages because of these characteristics:

1. Machines directly to a layout line — eliminating the need for working through the unwanted material to a layout line.
2. Removes the unwanted material in whole sections — does not remove it chip by chip. In this way it drastically reduces machining time and conserves the unwanted material for other possible uses.
3. Employs a long, continuous cutting, highly maneuverable tool which will machine with extreme rapidity along straight or irregular layout patterns; following almost any contour with ease. (Figure 2). The cutting burden and resulting wear are distributed over its many teeth resulting in longer tool life.

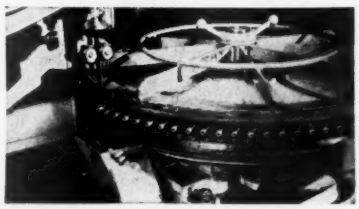
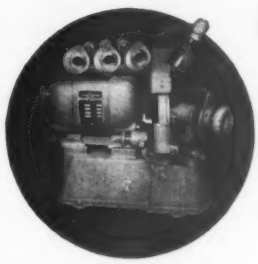


Fig. 4. Close up of the trimming operation on the jet engine turbine wheels. This is the "Friction Sawing" process where the band is run at high velocity so that the metal ahead of it is softened to permit machining of hardened, tough alloys. The new production band machines feature a wide speed range permitting high-speed as well as low-speed sawing.

Now, with the advent of the Demon high-speed steel saw band accelerating cutting rates 3 to 10 times and extending tool life 5 to 30 times, plus the advantages of power feeds, coolant facilities etc., many production tasks will be transferred to the production band machines (Figures 3 and 4). In many operations such as slotting, the mere elimination of complex fixtures cannot help but be reflected in an immediate production increase. On heavy jobs where large amounts of material were formerly removed chip by chip, the practice now will be to separate quickly most of the unwanted material on the band machine and then if necessary make the finishing cut using the original method.

Please Mention "TOOLING and PRODUCTION" When Requesting Information



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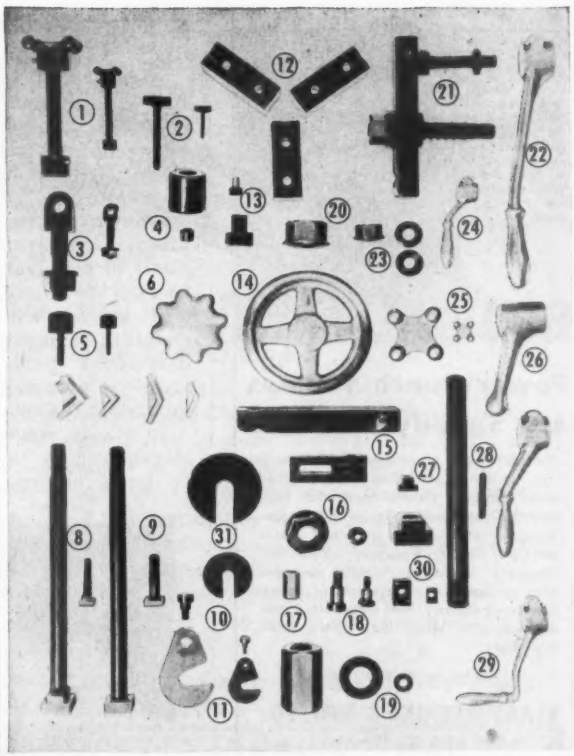

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1. Clamp Shoe Assemblies—14 sizes—alloy steel screws—hardened steel shoes with snap ring lock.
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3. Latch Screws—4 sizes—hardened.
4. Jig Rest Buttons—4 sizes—hardened—ground.
5. Quarter Turn Screws—9 sizes—soft steel.
6. Palm Grip Hand Knobs—with reamed, tapped, or square hole.
8. Tee Slot Bolts—standard sizes ⅜" to 1"—various lengths.
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19. Plain Flat Washers—8 sizes—hardened—ground.
20. Spherical Flange Nuts—9 sizes—hardened—ground.
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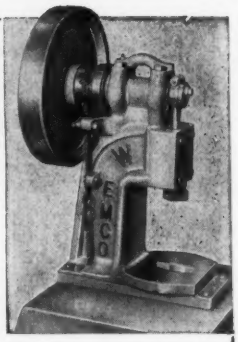

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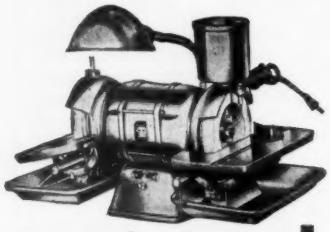

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GM Speeds Up Metal Sorting

A fast, accurate non-destructive instrument for sorting mixed metal parts with varying alloy content has been developed by General Motors Research Laboratories.

Known as the Thermoelectric Metal Comparator, the instrument is a portable device, easy to operate in any surroundings and usable wherever trouble-shooting is necessary to distinguish one part from another with composition the only distinguishable feature.

In plants, warehouses or other storage areas where bar stock or parts shipments have been scrambled inadvertently, the new GM Research comparator is expected to be a key device in restoring order or reclassifying materials.

The comparator also can detect chills in castings, which cause hardness differences. At the same time, favorable results have been obtained by using it to measure thickness of paint films and metallic plating. Further investigation is under way.

In its tryout stage, the comparator was used in several General Motors divisions for such jobs as these:

1. Sorting a stock of mixed steel in which SAE 1112 and SAE 1117 were separated. These steels differed only .05 per cent in carbon content, a difference difficult to detect rapidly by any other means. In this instance the division was faced with a wartime critical shortage of steel for certain types of gears, and the comparator's quick sorting job singled out the type of steel needed. A threatened production line stoppage was averted.

2. Preventing a mixup of metallic test bars used in inspection work.

3. Separating two types of automotive valves, also differing only slightly in chemical content or alloys. In this instance the valves were made for experimental engines when a mixup occurred and a non-destructive method was needed to sort them. As a result, the entire valve job did not have to be redone.

4. Separating a mixup of 12,000 clutch levers, some made of SAE 1010 and others made of SAE 1020.

5. Detecting chills in castings, an important factor in quality control.

Supplants Other Tests

Simply by touching the instrument's probe to a metal part, a person using the comparator can get an instant reading on a dial that compares the part's composition with composition of another part.

Dr. Edward J. Martin, Head of GM Research Laboratories' Physics and Instrumentation department, explained that the com-

. . . *Continued on page 220*

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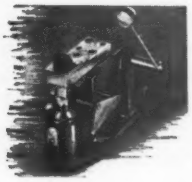

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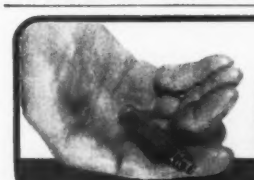

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Industrial News

The Pipe Machinery Co. (Gage Division) of Cleveland, Ohio manufacturer of Quality Control Gages, announces the appointment of distributorships to the Tool Crib, Inc. of Minneapolis, Minnesota and the Harwood Supply Co., Inc. of East Rochester, New York.

The Tool Crib, Inc. services Minnesota and Western Wisconsin, handling a complete line of carbide, flat tools, blanks, drill rods and ground stocks as well as standard high speed tools.

The Harwood Supply Co., Inc. are currently handling thread gages, plug gages, electronic gages and Swiss measuring instruments in the Rochester and Syracuse areas.

THREAD TRIANGLES
One set of these new thread measuring tringular bars quickly checks all 60 standard and special threads from 4-56 pitch any O.D. Prices complete with plastic chart and carrying case $8.60
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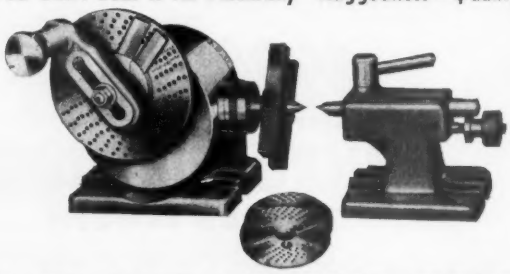

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. . . Figgerin, from page 202

been producing for our Armed Forces, slide-charts, on such problems as heating or duct installations in shipbuilding, lighting, meteorology, aircraft speed and distance computing. During the war, the organization developed a special technique for printing photographically on plastic and printed large quantities of speed and range scales that were used on all types of U. S. Naval vessels.

Other highly informative charts made by Perrygraf are the Fosdick Machine Tool Company's device which figures the time to drill through work thickness allowing for the length of the drill point separately, and the bending allowance and blanking pressure problem handled on the Dreis and Krump chart.

The calculators, on an average, cost the manufacturers who give them away between 15 and 20 cents apiece but can go as low as 3 cents or as high as 5 dollars per item.

This company employs 50 people who turn out some 20,000 pieces a day. The designers of the slide chart, on the whole, are graduate engineers, even though L. E. Perry, who started the organization in 1934 had no formal training in mathematics.

. . . Multiple Drilling, from page 218

rection for the drilling of each pair of holes.

An emergency switch is provided to rapidly retract the heads in the event of drill failure, thus avoiding damage to the sheet. Motor load meters on each power head indicate condition of drill sharpness.

Specifications

These opposed spindle drilling machines are made in a variety of sizes and models to suit individual customer requirements. The condenser tube sheet drilling machine shown here has a floor space of 15′ by 9′ and is 10′ high overall. Power is supplied by a Hill No. 2 power pack having a 5-hp motor and a 12-gpm pump. Two other Hill No. 1 power packs having 3-hp motor and 5-gpm pump furnish high pressure oil for hollow and gun drill type operations for each power head.

The power heads are V-belt driven by 10-hp motors. Each head is fed by twin hydraulic cylinders. A 4" dia. hydraulic cylinder positions the table. Twin 2" dia. cylinders position each head vertically. Double-size piston rods on all hydraulic cylinders, increase machine stability and reduce oil volume requirements on return strokes.

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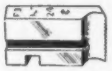

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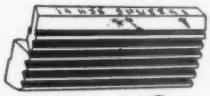

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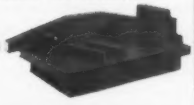

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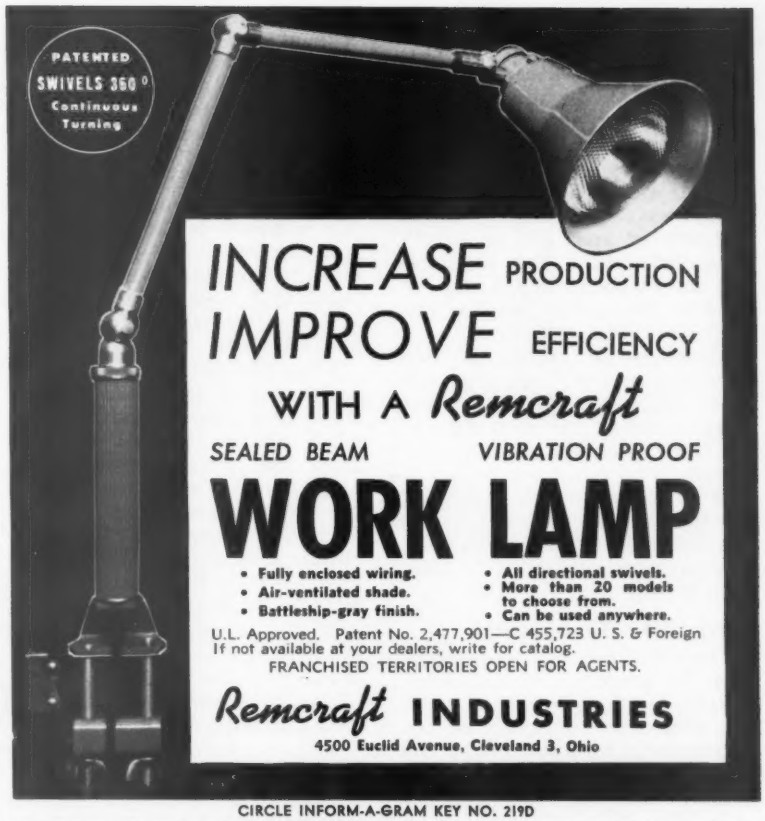

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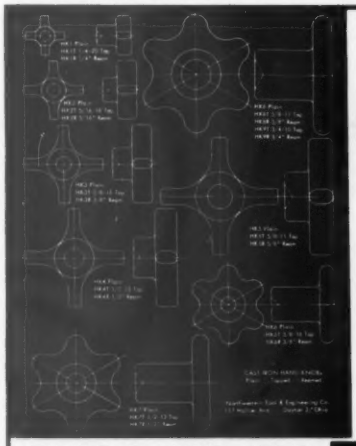

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CIRCLE INFORM-A-GRAM KEY NO. 219F

. . . Metal Sorting, from page 216

parator often accomplishes what is done by four other types of analysis — chemical, spectrographic, magnetic and spark tests.

Both chemical and spectrographic analyses, he pointed out, are to some extent destructive tests. Also, they require highly skilled technicians and are relatively time consuming. The comparator, on the other hand, can be used on the spot by an operator with no special skills.

Moreover, Dr. Martin said the new instrument's readings are more closely correlated with the composition of the material under test than results of magnetic testing.

It is not a cure-all, however, but thus far, he reported, it has adapted itself to most production problems assigned to it in General Motors.

Works Like Thermocouple

The GM Research comparator uses the principle of a thermocouple, but in an unusual way. The idea, first suggested by Dr. Martin, was followed up by the late Wesley S. Erwin, senior engineer, who headed the project in making the first trial model.

Later developments and applications were handled by Eugene A. Hanysz and Edward F. Weller, Jr., assistant head of Physics.

An ordinary thermocouple is a loop of two different materials. When one of the junctions of the metals is hot and the other cold, a small electric current flows through the loop.

For example, if copper and iron wires are twisted together to make a closed circuit and one of the junctions is heated, an electric current flows through the circuit. Voltage generated depends on temperature differences between the junctions of the dissimilar wires.

Thus, thermocouples are used as laboratory thermometers because they measure wide temperature ranges very accurately, from low temperatures to the melting points of iron and copper wire, for instance.

The GM Research comparator's circuit also is a loop of two different metals, but the part being tested (clutch lever, valve, steel bar, etc.) forms part of the loop or circuit. The instrument's two probe tips are the hot and cold junctions where they touch the metal under test.

Voltage Change Amplified

Since temperatures of the two junctions are kept constant, the change in metallic composition of the part under test results in a voltage change that can be read on the instrument's meter.

Because the small difference in temperature between the two tips results in a small voltage, an amplifier is included in the circuit to make possible use of a quick response-time indicator to increase sensitivity.

Thus, the comparator can be adapted to most problems by selecting the right set of probe tips. Several sets of tips are available in different alloys of steel and other metals.

The usual method of choosing a set of tips is simply to try the sets and pick out the one that gives the best separation readings for sorting metals. For a particularly difficult separation of mixed parts, it is possible to make a special set of tips for the comparator.

The instrument is now being tested for measuring thickness of metallic plating or paint films, comparing the surface layer with a similar layer of known thickness. In this application it operates as an ordinary thermocouple, detecting temperature changes at the hot junction.

When measuring thickness of electrically non-conducting films, such as paints on metals, a thin sheet of copper and aluminum foil placed over the paint film completes the electrical circuit between the comparator's two probe tips.

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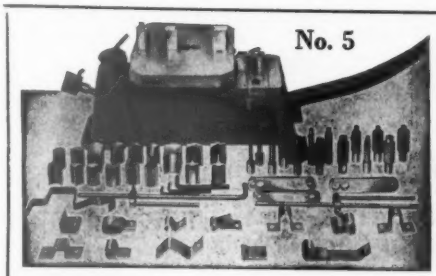

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CIRCLE INFORM-A-GRAM KEY NO. 221F

. . . Exposition, from page 201

Members of the panel include: J. L. Anderson, Chief Tool Estimator, Gisholt Machine Co.; J. S. Brozek, Superintendent of Tooling Division, Sargent & Co.; E. L. Ketter, Jacobs Manufacturing Co.; F. J. McArthur, Chief Tool Engineering, Jones & Lamson Machine Co.; T. H. Olson, Chief Tool Engineer, Yale & Towne Manufacturing Co.; J. Prohaska, Vice-President, Cleveland Automatic Machine Co.; and W. H. Spence, Sales Director, Brown & Sharpe Manufacturing Co.

Milling Problems

A group of specialists in the milling field will discuss "How to Lick Your Tough Milling Problems" on Wednesday, April 28. This panel discussion will be held in the ballroom of the Bellevue-Stratford Hotel at 8 p.m. It is the only panel discussion outside the Convention Center.

Members of the panel include: W. A. Coe, Sales Engineer, Nelco Tool Co., Inc.; J. Daugherty, Consultant, Giddings & Lewis Machine Tool Co.; Dr. Horace Frommelt, Staff Consultant, Detroit Milling Cutter Co.; K. B. Kaiser, Assistant Chief Engineer, Ingersoll Milling Machine Co.; E. J. Krabacher, Research Engineer, Cincinnati Milling Machine Co.; J. R. Roubik, Assistant Research Engineer, Kearney & Trecker Corp.; and T. G. Vickers, Master Mechanic, Clark Equipment Company's Trans. Div.

Inspection Improvements

"How to Improve Your Inspection Ways and Means" will be the topic for the panel discussion group on Thursday, April 29. This meeting will be in the Convention Center Ballroom at 3 p.m. Quality control, manual and automatic gaging, and nondestructive testing will be discussed.

Members of the panel include: P. G. Fishback, Manufacturing Engineer, Accessories Division, Thompson Products, Inc.; J. Manuele, Director of Headquarters Quality Control, Westinghouse Electric Corp.; F. Meyer, Jr., Chief Engineer, Taft-Peirce Manufacturing Co.; S. D. Nicolas, Chief Inspector, Merz Engineering Co.; E. C. Polidor, Chief Engineer, Optical Gaging Products, Inc.; G. H. Stimson, Gage Sales Manager, Greenfield Tap & Die Corp.; and F. B. Murphy, Field Manager, Johnson Gage Co.

Improved Workholding

One of the oldest, yet still challenging, responsibilities of tool engineers will be discussed by a panel of experts on Friday, April 30, at 3 p.m., in the Convention Center ballroom. Topic of the discussion will be "How Others Have Improved Their Workholding Ways and Means."

The panel will discuss fixtures, jigs, chucks, and collets and their actuation, whether it's mechanical, pneumatic, hydraulic, or magnetic.

Members of the panel include: J. L. Balciunas, Chief Engineer, Skinner Chuck Co.; L. R. Burger, Sales Manager, Logansport Machine Co., Inc.; K. Cole, Chief Designer, N. A. Woodworth Co.; J. I. Karash, Production Manager, Reliance Electric and Engineering Co.; P. Lindhuber, Chief Tool Designer, Spicer Manufacturing Division, Dana Corp.; R. W. Newton, Tool Analyzer, International Business Machines Corp.; and J. E. Rotchford, Vice President, Lodding, Inc.

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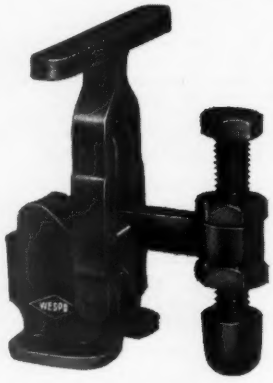

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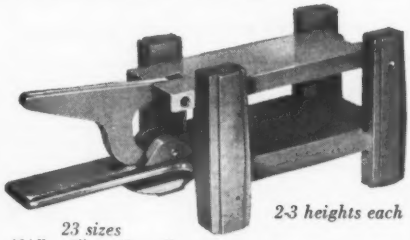

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A new and greatly improved 14" Hydraulic Vertical Surface Grinder of more rigid design throughout and higher table speeds has been developed. The new machine is available in either a 14" x 36" or 14" x 60"

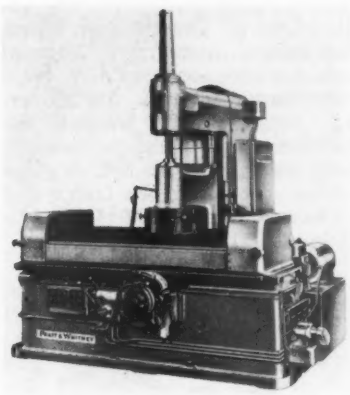

Photo courtesy Pratt & Whitney Co.

size with solid ring wheel or 17" x 36" or 17" x 60" size with segmental wheel.

Higher table speeds infinitely variable and uniform from two to a full 100 feet per minute permit the use of much harder, longer lasting wheels, thus lowering wheel costs. This range provides a grinding speed for almost any material adding substantially to the machine's versatility.

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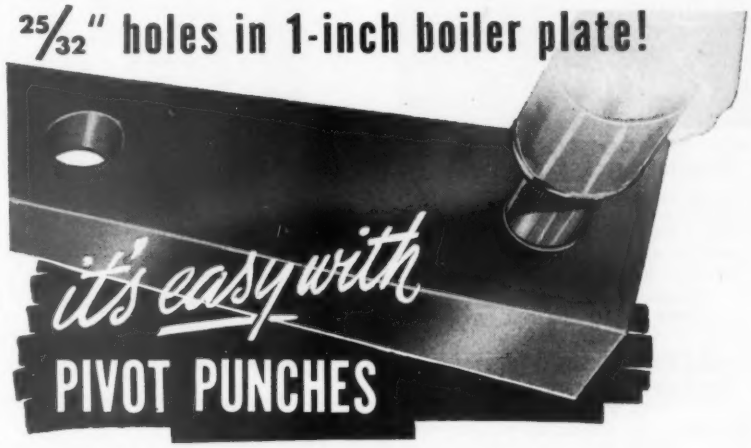
METHOD IMPROVEMENT CONTEST NOW OPEN

The Industrial Management Society announces it is now accepting entries for its Fourth Annual Methods Improvement Contest to be held in conjunction with its 18th National Time and Motion Study and Management Clinic, November 10-11-12, 1954 at the Hotel Sherman, Chicago.

Student groups in colleges and universities studying industrial engineering, as well as industrial plants and companies are invited to submit entries in the competition. The Society will award first, second and third place plaques to winning schools and companies. Individuals responsible for the improvements will receive certificates of merit.

Rules and regulations for the contest may be obtained by writing to the Industrial Management Society, 35 East Wacker Drive, Chicago 1, Illinois.



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"These are two of the many operations that we formerly drilled until we changed to Pivot Punches."

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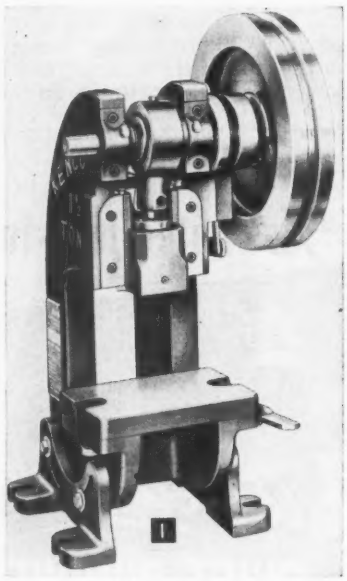
CIRCLE INFORM-A-GRAM KEY NO. 224C

1½ TON BABY PUNCH PRESS INTRODUCED

Anticipating an increased demand for small punch presses with high strength components, a Los Angeles press manufacture has developed two new presses as additions to their present line.

Their Model 1, Figure 1, which

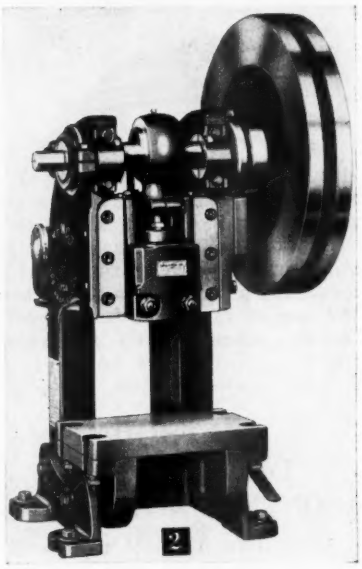


Photos courtesy Kenco Manufacturing Co.

is a 1½ ton baby press, was designed to meet a special need for light weight punching, forming, stamping and fabricating.

This press features a solid crankshaft of alloyed steel, heat-treated and precision ground; roller bearing-mounted flywheel; clutching mechanism self-contained and independent of the crankshaft; drive collar made of alloyed steel, heat-treated and ground; connecting rod and crankshaft bearings of special alloyed bronze; ram and ram guides 90° V-type with oversized length; frame of special alloyed casting structure, pre heat-tested, tested and precision-machined for positive accuracy. It is rated at 1½ tons and is capable of performing continuous heavy-duty work. The standard stroke is ¾", with 1" optional at extra charge. It is of the open back and inclinable type.

The other machine, Figure 2, is Model 7, a 7½ ton punch press, also of rugged construction and precision-built quality, to meet the needs of heavier punching, forming and blanking. The standard stroke is 1½", with a shut height of 8", with the adjustment up and the ram down, additional stroke up to 3" total can be secured; distance from ram center to back, 5¾", overall height, 32", weight 400 pounds. This press is made of Sobrocast structure, which gives added strength to the frame and increases the tensile strength from 30,000 to 60,000 pounds.



The crankshaft is solid, one-piece, heat-treated and precision-ground; ram is extra-heavy, with 7½", 90° V-type guides; the clutch mechanism is self contained with no hazardous slot in the crankshaft, giving added strength in punching; there is an additional and precision-ground companion drive with tongue and groove bolted to the flywheel; the flywheel has a twin roller bearing for long life and trouble free operation; the crankshaft and connecting rod bearings have S.A.E. 660 bronze bearing to carry punch load.

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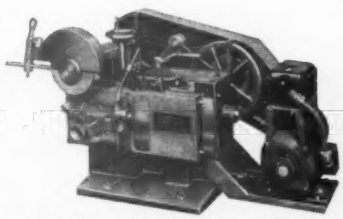

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CIRCLE INFORM-A-GRAM KEY NO. 225E

ELECTRONICS, SAFETY, AND TIMING

Gerald Florence, president of Benchmaster Manufacturing Co., California, has announced the appointment of Lance Mosdell as the new plant manager. He will be in charge of plant operations and the enlarging of present facilities in a new plant expansion program designed to produce Benchmaster's new Koil Kradle, punch press line and two-hand punch press controls.

Machines equipped with the Tele-Trol Safety clutch cannot be tripped in any fashion except by simultaneous motion of both hands which sends a single electrical pulse to the solenoid. All operator hazards are eliminated since the controls are located out of the danger areas.

At the same time Benchmaster announced a new electronic two-handed safety clutch designed by the Teletronic Laboratories. Designed for use on all devices requiring single-trip or single cycle control, this new safety clutch offers many features.

Machines cannot be tripped in any fashion except by simultaneous motion of both hands which sends a single electrical pulse to the solenoid. All operator hazards are eliminated since controls are located out of danger areas. More production is claimed because only finger touch is required, relieving fatigue and lost motion. Operators soon synchronize load trip and unload motions into a time-saving sequence.

The Tele-Trol converts any mechanical clutch to electric solenoid actuation. Installation is a matter of moments, requiring only the drilling and tapping of two holes. Wiring is complete. Plug-in connections are furnished by which several variations are possible in operation. Accessories are converting the mechanism into one hand, knee or foot control as well as remote-operation.

Another adaptation of the Tele-Trol is the new Tele-Trol Electronic timer which was originally developed as a time delay shut-off for Benchmaster Koil Kradles. These timers are now available for application to a wide variety of mechanical and electrical equipment.

The Tele-Trol timer is continuously variable from 0 to 10 seconds and immediately re-cycles when triggered. Since it is of the accumulative type the re-cycle time is added to the balance of the previous cycle, if triggering occurs before shut-off is reached.

The Tele-Trol timer handles a 30 amp non-inductive load at 125 V.A.C. Timer operates on 110 V single phase but models are available for 220 or 440 V 3 phase operations. Overall size is approximately 3″ x 4″ x 5″. The Tele-Trol timer furnishes an accurate means of delaying shut-off or start on all types of units such as work feeding devices and other equipment utilizing electrical motor drives.

1,000 Tools To Be Made Per Day At Exposition

Actual production of carbide tools, from the raw material to the crating of finished tools for shipment, will be one of the unusual features of the Industrial Exposition.

More than 25 firms are participating in the production line to be located in the South Exhibit Hall Extension. The Carbide carbide Tool Company of Detroit will supervise the operating exhibit under the sponsorship of the Carbide Processors Supply Company of Detroit.

One thousand carbide tools will be made each day of the Exposition. These will include tools of various descriptions from the Ford Motor Company, Lees Bradner Company, Electromotive Division of General Motors, Caterpillar Tractor Company, and Pratt & Whitney Aircraft Company.

More than 1500 pounds of steel will be cut each day to keep the production line flowing smoothly.

Production line equipment will include the latest in machines and precision control accessories. One of the features will be the battery of four new grinders developed by Carbide Processors Supply Company. They will be unveiled for the first time at the Exposition.

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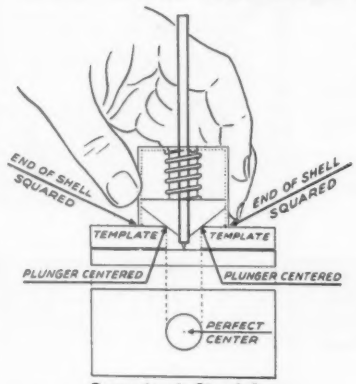

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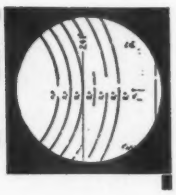

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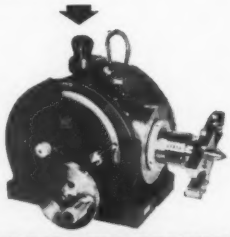

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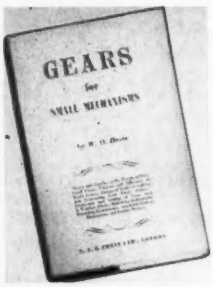

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Detailed, illustrated information from Barnes Drill Company, 852 Chestnut Street, Rockford, Illinois, Bulletin No. 500-F.

Circle Inform-A-Gram Key No. D2.

Producers Pare Stamping Costs

Modern Coil Handling Equipment Widens Use of Low Cost Coil Stock

The battle to keep down costs is going well for producers of stampings. Coil stock and modern coil handling equipment are the decisive factors. Coil stock, with only two scrap ends to its entire length is far more economical than strips of straight stock with two scrap ends to every ten feet. Moreover, the type of coil loading and handling equipment built by F. J. Littell Machine Co. makes coil stock easier to handle than straight stock. Stamping producers are taking full advantage of these developments. Coil stock and Littell Coil Hooks, Reels, Straightening Machines and Automatic Roll Feeds are in wider use today than ever before.

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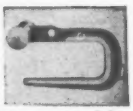

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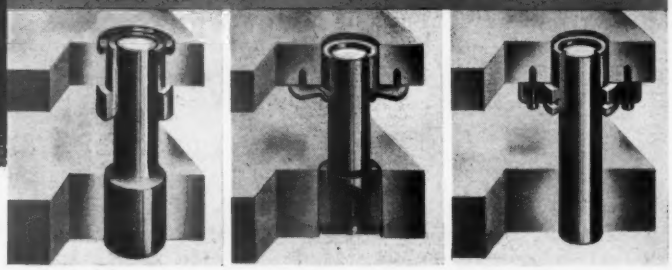

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